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MASTER DEVELOPMENT DRAINAGE PLAN
FOR
VINEYARDS COMMERCE PARK

AUGUST 2008

PREPARED FOR:
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DRAINAGE REPORT STATEMENT

ENGINEER'S STATEMENT:
The attached Master Development 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 for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

Kyle R. Campbell, Colorado P.E. #29794

8.21.08
Date

COLORADO LICENSED
KYLE R. CAMPBELL
29794
PROFESSIONAL ENGINEER

DEVELOPER'S STATEMENT:
I, the developer, have read and will comply with all of the requirements specified in this drainage report and plan.

Business Name: Vineyards, LLC

By:

Title: ~~Vice President~~ Manager

Address: 111 S. Tejon, , Suite 112

Colorado Springs, CO 80903

CITY OF COLORADO SPRINGS ONLY:
Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.

City Engineer

9/3/08
Date

Conditions:

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PURPOSE

The intent of the owner/developer is to annex the Vineyard Commerce Park into the City of Colorado Springs. The purpose of this Master Development Drainage Plan, as part of the annexation process is to identify major drainage features and facilities and to estimate peak rates of stormwater runoff, from on-site and off-site source, and outline the necessary improvements to safely route developed storm water runoff to adequate outfall facilities.

GENERAL DESCRIPTION

Vineyards Commercial Park is a 108.63-acre site located within Section 33, Township 14 South, Range 66 West of the Sixth Principal Meridian in the City of Colorado Springs, County of El Paso, State of Colorado. The site is bounded on the north by existing Stooks Subdivision, Tranex Subdivision Filing No. 1, Harrison Park Filings 11 & 17, Executive Circle Drive, and the Colorado Springs Youth Sports Complex. The site is bounded to the east by Fountain Creek, to the South by Hassler and Bates Subdivision Filing No. 1, Lot 1, Block 1 and the existing Sinton Outfall Channel, and to the west by the frontage road portion of Janitell Road that parallels a portion of I-25.

Soil types considered at the site as determined by the "Soil Survey of El Paso County Area," June 1981, consist of Ellicott, Hydrologic Group "A", Fluvaquentic Haplaquolls, Hydrologic Group "D" Nunn, Hydrologic Group "C", Schamber Hydrologic Group "C", and Ustic Torrifluvents Hydrologic Group "B" as prepared by the Soil Conservation Service (see map in Appendix).

EXISTING DRAINAGE CONDITIONS

The site proposed for annexation is located within the Stratton Drainage Basin. The majority of the site in its existing condition houses the Vineyards Golf Course. Existing grades on the site has slopes typically range from 1% to 10%, with small areas possessing slopes up to 3:1. The site possesses large areas of native grasses and those associated with golf course fairways and roughs. The western two-third of the site possesses large areas of native grasses and those associated with golf course fairways and roughs, with a few small stands of deciduous trees, dirt access roads, a small clubhouse, with a few sparsely located maintenance buildings and private residences. The

remaining eastern portion of the site, consists of dense deciduous trees, golf course grasses and a small 4-5 wide concrete public trail system that parallel Fountain Creek. Nearly all sites bordering the north boundary of the site, with the exception of Harrison Park Filing No. 17, have been developed, while I-25, Janitell Road, a major drainage channel, and Fountain Creek act to isolate the remainder of the property. This site falls across Basins 041 and 042 as studied within the Stratton Basin Outfall Study. Per the aforementioned study runoff from the site is expected to flow eastward towards Fountain Creek.

Detailed Existing Conditions

A portion developed runoff from two retail/industrial buildings (within the Sipilovic Subdivision and the EMF building) located directly west of the subject site, discharge into an undeveloped field (refer to the enclosed drainage map - northwest corner of the proposed site) known as Harrison Park Filing No. 17. Runoff crossing the undeveloped parcel then combines within runoff produced from the adjacent business, storage, and warehouse buildings, and the youth sports complex facility all located along the northern property line. In the existing condition approximately 7.98 acres (EX-1) from the within the proposed Vineyards site combines with the adjacent offsite flows and continues easterly towards Fountain Creek. Per their respective drainage reports a small v-shaped ditch was to be constructed along the rear lot lines of these properties, which would facilitate the runoff reaching Fountain Creek. Although site inspection provided evidence of runoff being transported across this area to Fountain Creek, the swale which was to be constructed is not readily defined. The existing area shows no signs of erosion and based upon is rather width path does not look to threaten any surrounding developments.

Approximately 6.16 acres (EX-3) located along the southwestern portion of the site includes a private residence, trees and native undisturbed vegetated hillsides, a portion of a wide drainage channel, a portion of a small detention pond. In the existing condition runoff from this portion of the site is routed overland to the existing channel and pond. The widened channel and pond are elements of a wetlands mitigation effort that was conducted with the construction of the World Arena and direct large upstream developed flows to a large trapezoidal channel that skirts the southern boundary of the subject site which terminates at Fountain Creek.

The existing channel located along the southern boundary of the site, is known as the Sinton Drainage Outfall Channel. This channel was designed to convey upstream runoff reaching the Sinton Outfall and Stratton Basin Drainage Storm Sewer System, runoff from portions of Janitell Road and I-25, as well as, runoff diverted from the Harrison Outfall Box Culvert. Information taken from various drainage reports and record drawings on file at the City of Colorado Springs (Drawing and Reports were not available at the time of this report from El Paso County) indicated that a total of 1360 cfs is routed to the Sinton Outfall prior to release within the channel. Approximately 610 cfs was to be routed underground within an existing 72" RCP eventually discharging out into the Sinton Channel while the remaining 750 cfs was routed as surface flow (NO CONSTRUCTION PLANS HAVE BEEN ABLE TO BE LOCATED FOR THE EXISTING 72" RCP), of which the primarily portion of the flow is discharged across Janitell Road and into the wide portion of the drainage channel via a large 11'-8" x 14' box culvert that runs underneath I-25 directly west of the subject site. A copy of the release rates taken from the "Drainage Conditions at and Recommended Modification to the Harrison Outfall," prepared by Drexel Barrel in 1997 showing these flow and discharge totals, has been included within the appendix of this report. Upon inspection of the site, substantial riprap was noted along the portion of the east side of Janitell Road directly adjacent to the large box culvert to possibly aid in the prevention of erosion and undermining of the existing roadway. Also it was noted that the channel and pond although possessing some native grasses was found to contain no runoff. Representatives from Walsh Engineering having visited the site in March of 2007 noted in their initial assessment of the site to find this portion of the previous mitigation to have "not been successful."

The central portion of the site (EX-2) that houses much of the existing golf course totals approximately 86.60 acres. Generally, this portion of the site is relatively flat with the overland drainage directed to a small pond located along the southern boundary line. Features within the golf course such as the fairways, greens, and tees boxes create topographic undulations, which in turn detain runoff and create multiple drainage release points. For this reason accurate overland flow paths and times are difficult to ascertain. A total of three ponds are located within the golf course, the first previously mentioned lies along the southern border of the site, while the other two are located just below the northern border. All three ponds look to have been man-made. A preliminary site inspection performed by Walsh Engineering reveals little wetlands associated with the ponds

extending beyond the embankments; however a full study will be conducted prior to any development. As previously mentioned the drainage for this area is directed towards a low point centralized along the southern boundary truncated by the Sinton Outfall Channel. The low elevations of the pond are nearly 5-ft below the top of the embankment of Fountain creek, a 12" CMP pipe exists at the southerly low-point of the pond. No approved drainage reports for this area contained any data or information on the installation of this 12" pipe under the Sinton Channel. "Existing" condition flows from the 12" pipe under the Sinton Channel will be identified based on anticipated ponding elevations north of the channel. "Historically", the drainage maps within the SDBPS identify all the flow from the basin moving east and south across the original 042 basin. That "Historic" Flow pattern is truncated by the existing Sinton Outfall Channel. Though there were no design points in the SDBPS which are equivalent in location to the now low-point upstream of the Sinton Channel, and no re-evaluation of the impact of the channel in terms of drainage from Basin 042 were completed or are locatable, the Historic Discharge from the SDBPS basin 042 is 110-cfs (10-yr) and 200-cfs (100-yr).

The eastern portion of the site (EX-4) consists of dense trees, portions of the golf course, a public trail system, and portions of Fountain Creek. Runoff produced within the existing 7.78 acres is separated from the central portion of the site by a small ridge line, that runs the length of the site north-south. All runoff produced with this portion of the site sheet flows into Fountain Creek. A preliminary site inspection performed by Walsh Engineering reveals the site in its existing condition "not suitable to fulfill the life requisites of the T&E" (Threatened and Endangered) "species listed for El Paso County with the exception of avian species", and "because of the undeveloped nature of the property it's highly likely that local wildlife use the site."

In the existing condition a portion of this site is located within both the 500-yr and 100-yr floodplains as well as the floodway as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Number 08041C 0741F, and 008041C 0742F, effective date, March 17, 1997 (See Appendix). A LOMR-F will be prepared and submitted to FEMA, based upon the current planned development, which will act to remove a portion of the site from the 100 yr-floodplain (refer to Developed Drainage Map).
Based upon a preliminary geotechnical investigation of the site, groundwater is found to be relatively close to the surface across the subject site (refer to enclosed ground water surface map in appendix).

This information should be utilized in the design of the proposed building foundations and unless special design considerations are utilized basements should probably be avoided for portions if not all of the site. A licensed geotechnical should be contacted to provide recommendations regarding these conditions.

PROPOSED DRAINAGE CONDITIONS

Although the parcel of land proposed for annexation into the City of Colorado Springs, totals 108.576 acres, the planned 20-lot industrial park will act to only develop approximately 61.06 acres of the Vineyards Commerce Park. The remaining 47.52 acres of the site is planned to remain in its existing state with only minor disturbance associated with drainage improvements and wetland mitigation. Generally, runoff from this proposed site will be directed to four distinct locations, in keeping to the sites existing flow conditions. Runoff developed within the northern portion of site, along the boundary, will be directed eastward within a proposed drainage swale/pipe system terminating at Fountain Creek. Two approaches toward determining flows from the properties and runoff sources to the north were employed. First, offsite flows were determined based on those properties to the north detaining their developed runoff to historic levels, per the approved final drainage report for Harrison Park Filing No. 17 (denoted by Design Points A thru F). Secondly, those offsite flows were determined as if no detention were employed in the Harrison site (denoted by Design Points 1, 2, and 4 thru 7). These 2 offsite flow determinations are provided at the request of the developer of the Vineyards Commerce Site. For this submittal, it will be assumed that the detention will be required with the development of the Harrison site; however proposed downstream facilities have been preliminarily sized using non-detained direct release. Runoff from a small portion of land along the southwestern corner of the proposed site, will remain unchanged from the existing condition and be released un-detained into the Sinton Outfall Channel. Due to grading constraints and the need for an entrance roadway into the site, some additional improvements to this portion of the site are required. The Sinton Channel will be extended to the north along the Frontage Road. The Sinton Channel extension will necessitate some grading in the area previously identified as wetlands mitigation area for the World Arena. Again, the wetlands mitigation previously attempted in this area was unsuccessful so the grading will not disturb viable wetlands, but the disturbed area will need to be replanted or mitigated.

Runoff produced within the proposed commerce park will be routed within and through the proposed streets and though multiple storm sewer systems and channels to eastern boundary of the proposed site. The collected runoff leaving the site is planned for direct discharge into various stilling basins located along the property line and allowed to sheet flow across the existing golf course. Sediment will be collected within the stilling basins, while the overland should act to filter the remaining oils and suspended solids. Flows as in the existing condition are routed to an existing man made pond at the south end of the annexed parcel, which will act as final water quality control prior to the developed condition flows exiting the site. Flows reaching the pond will be allowed to back charge across the golf course until discharging into Fountain Creek. A small discharge pipe is located along the south end of the site that discharges under the Sinton Channel to the adjacent property. The channel embankment may need to be widened along the ponding area ensure protection of the channel and provide a service roadway from the site to the outlet into Fountain Creek. All proposed storm sewer shown on the concept plan, including the Water quality pond adjacent to the Sinton Channel, will be considered public and thus fall under the City of Colorado Springs maintenance and ownership. Thus nearly all of the planned infrastructure will be incorporated in to tracts, easements and right of way with access and service roads as required by the City of Colorado Springs Drainage Criteria Manual. Both the existing unchanged portion of the Sinton Channel, and proposed improvements and extensions to the Sinton Channel including the dual-box culvert under the proposed entry way shall be owned and maintained by El Paso County.

Detailed Developed Conditions

Design Points 1-7 and Design Points A-F are used to analyze the runoff rates at the same respective locations. Both sets of Design Points anticipate the development of Harrison Park Filing No. 17; Design Points A-F assume that the detention pond discussed within the Filing No. 17 Drainage Report are constructed and reduce developed condition flows to peak historic rate, while Design Points 1-7 show the flow rates if the detention pond was not constructed. As previously mentioned for the purpose of this report the pond shall remain a requirement upon development of the site and will be required to meet the historic discharge rates of 13.7 cfs in the 5-yr event and 30.4 in the 100-yr event. However at the request of the developer all downstream facilities have been designed to accommodate the non-detained runoff.

Design Point 1/A (Q_5 = 34/22 cfs, Q_{100} = 65/46 cfs) consists of runoff from offsite Basins OS-A. Basin OS-A, a 9.99-acre basin, is composed of light industrial and commercial/office buildings with some minor landscaping and grass. Runoff reaching Design Point 1 will enter the north west corner of the proposed Vineyards via proposed 10' wide x 3.0' deep trapezoidal swale with 4:1 side slopes. A small amount of riprap should be placed at the beginning of the swale to aid in the prevention of erosion. The proposed swale will be constructed within a minimum 30' wide public drainage easement. Runoff upon entering the channel will continue eastward swale to Design Point 2.

Design Point 2/B (Q_5 = 43/32 cfs, Q_{100} = 89/71 cfs) consists of storm runoff from Design Point 1, Basin OS-B, and Basin A. Basin OS-B is a 3.96-acre site consisting of a storage unit site, a warehouse building, and a small industrial or commercial building. Runoff from these sites reach the on-site proposed swale as sheet flow totaling (Q_5 = 5 cfs, Q_{100} = 14 cfs). Basin A consists of the rear lot portions of proposed lots 8-11. Runoff from this basin will be intercepted by the proposed swale. It should be noted, if runoff from the individual sites of Basin OS-B and A reach the swale as channelized flow some additional riprap or erosion control blanket maybe at these discharge point to protect the swale embankments. Runoff reaching Design Point 2 is directed under the proposed northern entrance via a proposed public 2'x 7' reinforced concrete box culvert (Pipe 1). The recommendation of a box culvert lies in the relatively low allowable headwater and relatively low amount of cover between the proposed roadway and the invert of the swale. Runoff with the RCB continues eastward to Design Point 4.

Design Point 3 (Q_5 = 3 cfs, Q_{100} = 6 cfs) consists of storm runoff from Basin B. Basin B is a 0.78-acre basin primarily composed of a section of the northern portion of Road 1. Runoff developed within this basin will be conveyed via curb and gutter to a low point within the street, where flows will be intercepted by a pair of proposed public 4' D-10-R sump inlets. Runoff collected by the proposed sump inlets will be conveyed to the RCBC via two public 18" RCP storm drains (Pipes 2 and 3).

Design Point 4/C (Q_5 = 45/34 cfs, Q_{100} = 93/75 cfs) was developed to aid in determining the runoff reaching outlet side of the proposed box culvert (a.k.a Pipe 4) as it transitions to a 48" RCP. Runoff continues downstream to Design Point 5.

Design Point 5/D (Q_5 = 46/35 cfs, Q_{100} = 96/76 cfs) consists of flows from Basin OS-C and Basin C as well as flows from Design Point 4. Basin OS-C a 0.69-acre area of irrigated grass and a portion of an outdoor hockey rink located within the Youth Sports Complex produces runoff totaling Q_5 = 1 cfs, Q_{100} = 2 cfs. Basin C a 0.32-acre area consists of a portion of proposed lot 12 and has been calculated to discharge approximately Q_5 = 1 cfs, Q_{100} = 2 cfs. Developed runoff from the two basins is conveyed overland to a proposed public 2'x2' area drain. Intercepted flows will combine with runoff with Pipe 4 and continue eastward to Design Point 6.

Design Point 6/E (Q_5 = 46/35 cfs, Q_{100} = 99/81 cfs) consists of storm water runoff from Offsite Basin OS-E, Basin R, and those flows conveyed within Pipe 5. Basin OS-E (Q_5 = 3 cfs, Q_{100} = 11 cfs), a 3.10-acre area of baseball fields associated with the Youth Sports Complex combines with runoff produced within Basin R (Q_5 = 1 cfs, Q_{100} = 1 cfs). The runoff from the two aforementioned basins combine with runoff conveyed with a proposed 48" RCP and discharge into a proposed 10' wide x 3.0' deep trapezoidal swale with 4:1 side slopes. This collected runoff totals 2 cfs less in the 5-yr and 17 cfs lower in the 100-yr than flow reaching this point in the existing condition assuming detention upstream within the Harrison Park site. Without on-site detention at the Harrison Site, flows within the channel are approximately 7 cfs and 11 cfs higher than what was calculated to reach DP-A (Q_5 = 37 cfs, Q_{100} = 88 cfs) (refer to Existing Condition Map). Runoff will continue eastward to Fountain Creek and Design Point 7.

Design Point 7/F (Q_5 = 48/37 cfs, Q_{100} = 106/90 cfs) consists of storm water runoff from Offsite Basin OS-F, Basin S, and those flows conveyed with the channel from Design Point 6. Basin OS-F (Q_5 = 3 cfs, Q_{100} = 11 cfs), a 5.12-acre area of grass and soccer fields associated with the Youth Sports Complex combines with runoff produced within Basin S (Q_5 = 1 cfs, Q_{100} = 1 cfs). The runoff from the two aforementioned basins combine with runoff conveyed with a proposed channel and discharge into Fountain Creek. This collected runoff totals 1 cfs less in the 5-yr and 4 cfs lower in the 100-yr than flow reaching this point in the existing condition assuming detention upstream within the Harrison Park site. Without on-site detention at the Harrison Site, flows within the channel are approximately 10 cfs and 14 cfs higher than what was calculated to reach DP-B (Q_5 = 38 cfs, Q_{100} = 94 cfs) (refer to Existing Condition Map). It is important to understand that existing conditions referred to within the last several design point paragraphs do not reflect historic flows reaching the

specific locations. This information is simply provided to aid in determined how much additional flow is produced by the proposed site. The historic reference for the site is included within the Stratton Drainage Basin Planning Study.

Design Point 8 (Q_5 = 21 cfs, Q_{100} = 42 cfs) consists of storm water runoff from Basins D a 5.81 acre area comprising of proposed lots 5, 6, and 7. Runoff produced from these sites will be conveyed to a proposed public 36" RCP Storm Drain (Pipe 8) located with Road 2. Runoff directed to the pipe will continue east to Design Point 10.

Design Point 9 (Q_5 = 8 cfs, Q_{100} = 15 cfs) consists of flows primarily developed and contained within portion of Road 1 and part of Road 3. A pair of 8' at-grade inlets will intercept approximately 2.1 and 4.9 cfs in the 5 and 100 yr events respectively, per side, each with a flow-by of 0.8 and 2.1 cfs respectively. The intercepted flow will combine with Pipe 7 flows in Pipe 9 (36" RCP) totaling Q_5 = 27 cfs, Q_{100} = 54 cfs while the remaining surface flow will continue eastward to Design Point 10.

Design Point 10 (Q_5 = 30 cfs, Q_{100} = 65 cfs) consists of storm water from Basin F, Basin G, and flow-by from Design Point 9. Basin F (Q_5 = 16 cfs, Q_{100} = 37 cfs) consists of approximately 4.90 acres of the front half of proposed lots 8-11 and half of Road 2. Basin G a 4.02 acre area, and houses a small portion of proposed lot 5 as well as lot 4 in its entirety and is expected to discharge approximately Q_5 = 13 cfs and Q_{100} = 27 cfs. A proposed 24" sump inlet will collect the combined street runoff Q_5 = 30 cfs and Q_{100} = 65 cfs. Runoff within Pipe 9 will combine with flow intercepted by the sump inlet and will be discharge Pipe 10 a proposed public 48" pipe will convey the combined flow of Q_5 = 55 cfs, Q_{100} = 116 cfs to a proposed 10' wide x 3' deep trapezoidal grass lined channel that will discharge the collected flows out into the abandon golf course, where they will collect ultimately at Design Point 26.

Design Point 11 (Q_5 = 6 cfs, Q_{100} = 16 cfs) consists of storm water from Basin OS-D and portion of Basin H. Basin OS-D consists of 2.60 acres of existing ball fields and irrigated grass within the adjacent Youth Sports Complex. Runoff from this basin (Q_5 = 3 cfs, Q_{100} = 12 cfs) sheet flows onto proposed lot 12 where it combines with runoff produced from approximately 1/3 of Basin H. This

combined runoff discharges off the back of the commerce park site, into a proposed stilling basin before discharging onto the existing abandon course.

Design Point 12 (Q_5 = 9 cfs, Q_{100} = 17 cfs) consists of remaining 2/3 of Basin H. Runoff from this basin is conveyed to Design Point 13/13A.

Design Point 13A (Q_5 = 38 cfs, Q_{100} = 88cfs) is the combined runoff from Pipe 10 and Design Point 12. Storm water runoff reaching this design point will continue across the golf course to Design Point 26. One of the golf course ponds is located directly adjacent to this combined release point, which makes it an optimal location to mitigate for disturbed wetland habit. (Design Point 13 was shown to demonstrate the decrease in the peak flows when Design Point 11 was added to the runoff calculation due to is significantly larger time of concentration).

Design Point 14 (Q_5 = 11cfs, Q_{100} = 22 cfs) consists of runoff produced with the development of approximately 1/2 of 6.22 acre Basin I (lot 13). This combined runoff discharges off the back of the commerce park site, into a proposed stilling basin before discharging onto the existing abandon course, where it will continue as surface flow to Design Point 26.

Design Point 15 (Q_5 = 11cfs, Q_{100} = 22 cfs) consists of runoff produced with the development of approximately 1/2 of 6.22 acre Basin I (lot 13). This combined runoff discharges off the back of the commerce park site, into a proposed stilling basin before discharging onto the existing abandon course, where it will continue as surface flow to Design Point 26.

Design Point 16 (Q_5 = 15cfs, Q_{100} = 31 cfs) consists of runoff produced within 4.30 Basin K (lots 1 and 2). A proposed public 30" RCP (Pipe 11) will intercept the runoff and direct it down pipe to Design Point 21.

Design Point 17 (Q_5 = 6cfs, Q_{100} = 13 cfs) consists of runoff produced within 1.69 Basin L (lot 3). A proposed public 24" RCP (Pipe 12) will intercept the runoff and direct it down pipe to Design Point 21. Pipe 11 and Pipe 12 combine within a proposed public 36" RCP (Pipe 13) conveying a total of Q_5 = 21cfs, Q_{100} = 43 cfs to Design Point 21.

Design Point 18 (Q_5 = 14cfs, Q_{100} = 29 cfs) consists of runoff produced within approximately ½ of the 7.92 Basin J (lots 14 and 15). A proposed public 30" RCP (Pipe 14) will intercept the runoff and direct it down pipe to Design Point 21. Pipe 13 and Pipe 14 combine within a proposed public 42" RCP (Pipe 15) conveying a total of Q_5 = 33 cfs and Q_{100} = 67 cfs to Design Point 21.

Design Point 19 (Q_5 = 15cfs, Q_{100} = 28 cfs) consists of runoff produced within the northern portion of lots 18 thru 20, and a portion of Road 1 and Road 3. The 3.68 Basin M is collected within a proposed public 10' D-10R Sump Inlet. At this location runoff intercepted by the inlet will combine with runoff conveyed with the proposed 42", Pipe 16. The combine flow of Q_5 = 46 cfs and Q_{100} = 92 cfs, will continue to Design Point 21 via a small section of 48" RCP and a proposed public 10' wide x 3' high trapezoidal channel (Section F-F)

Design Point 20 (Q_5 = 14cfs, Q_{100} = 29 cfs) consists of runoff produced within the remaining half of the 7.92 Basin J. Runoff from this basin is conveyed to Design Point 21.

Design Point 21 (Q_5 = 56 cfs, Q_{100} = 114 cfs) is the combined runoff from Pipe 16 and Design Point 20. Storm water runoff reaching this design point will continue across the golf course to Design Point 26. It is anticipated that a stilling basin should be placed at DP-21 to aid in spreading the flow and lowering velocities over what is anticipated within the proposed channel.

Design Point 22 (Q_5 = 11 cfs, Q_{100} = 22 cfs) consists of runoff produced within the remaining half of the 6.14 Basin O (portion of lot 17). Runoff from this basin is conveyed via surface flow to Design Point 26.

Design Point 23 (Q_5 = 5cfs, Q_{100} = 11 cfs) consists of runoff produced within a portion of the 6.14 Basin O. Runoff from this basin is conveyed via surface flow to Design Point 26.

Design Point 24 (Q_5 = 11cfs, Q_{100} = 22 cfs) consists of runoff produced within 2.94 Basin N (a portion of 19 and 20). A proposed public 24" RCP (Pipe 17) will intercept the runoff and direct it down gradient to a proposed public 4' wide x 3' deep 4: 1 trapezoidal swale. Runoff continues southwesterly Design Point 25.

Design Point 25 (Q_5 = 15cfs, Q_{100} = 30 cfs) consists of runoff produced within a portion of the 7.92 Basin O and flow from with Pipe 17 (Q_5 = 11cfs, Q_{100} = 22 cfs). The combined runoff will combine with other on-site and off-site flows at Design Point 26.

Design Point 26 (Q_5 = 95 cfs, Q_{100} = 200 cfs) consists of runoff produced by Design Points 13A, 14, 15, 21, 22, 23, and 25. Runoff from these individual design points flow across the abandoned golf course until combining at the existing pond located in the south central portion of the undeveloped area of the site.

Design Point 27 (Q_5 = 111 cfs, Q_{100} = 246 cfs) is in the same location as Design Point 26, but includes the addition of flows produced within the undeveloped Basin Q. Basin Q (Q_5 = 30 cfs, Q_{100} = 76 cfs) is a 38.96 acre portion of the site, consisting of undeveloped portions of the golf course.
In the existing condition prior to the development of the proposed the total flows reaching the DP-D totaled Q_5 = 63 cfs, Q_{100} = 168 cfs. Thus with the development of the site, flows reaching this point have increase 48 cfs in the 5-yr event and 78 cfs in the 100-yr event.

Design Point 28 (Q_5 = 6 cfs, Q_{100} = 16 cfs) consists of runoff produced within 7.57 acre Basin T. Basin T consists primarily of dense trees and grass which sheet flows out in Fountain Creek. No major modification to alter these totals. These flows will combine with flows resulting from backwater at DP 27, and discharge into Fountain Creek (up to the 5-year event- after which the water surface elevation in Fountain Creek will likely inundate the site).

Design Point 29 (Q_5 = 6 cfs, Q_{100} = 16 cfs) consists of runoff produced within 1.23 acre Basin P. Basin P consists of portion of lot 19 and 20. Runoff from this portion of the site will discharge into Sinton Outfall Channel. This is less than the release rates in the existing conditions and thus should not have any negative impact to the channel.

Additional Detail and Analysis

Due to the MDDP, being submitted to accompany the concept plan, a full SCS analysis of the Historic vs. Developed Drainage Basin was not completed. In lieu the following argument was utilized due to the preliminary nature of the submittal.

As previously mentioned, the only historic analysis of the site was performed with the Stratton Drainage Basin Outfall Study (SDBOS), 1994, prepared by Drexel Barrell. & Co. The Proposed Vineyards Commerce Park falls within two of the studied basins in the aforementioned report: Basin 041 and Basin 042. The existing and developed conditions for the basins are provided within the report in 24-hour; 10 and 100 year events. Basin 041, which consists of 0.198 square miles (126.75 acres), per the SDBOS has historic release rates of 130 cfs in the 10 yr and 250 in the 100 yr, while Basin 042 which consists of 0.135 square miles (86.4 acres) has corresponding values of 110 and 200 cfs. Both parcels are expected to be developed using medium density industrial CN values (refer to Appendix). Based upon the prior study, the maximum allowable developed release rates into Fountain Creek from Basin 041 is 230 cfs in the 10-yr and 380 cfs in the 100-yr. This yields an acceptable increase in developed flow to the Creek of 100 cfs in the 10yr event and 130 cfs in the 100 year event). Basin 042 had corresponding developed values of 230 cfs and 350 cfs; an increase of 120 cfs in the 10yr and 150 cfs in the 100 year event over Historic.

The two studied basins (041 and 042) within the Stratton Drainage report total 213.15 acres and the Vineyard Commerce site totals 108.5 acres. Based upon these areas it can be determined that the proposed sight is approximately 50% of the area of the two studied basin; 041 and 042. Both basins originally described in the SDBOS have undergone only marginal changes since the report was submitted. Basin 042 is still in its historic condition, and drainage reports (Executive Business Park and Drainage Study for Harrison Creek Basin) for the small areas of minor development in the north part of Basin 041 indicate developed condition flows in accordance with development anticipated in the study. The subject site should be able to release developed flows as a relative percentage of its area in comparison to the two basins total acreage.

The allowable developed flows for the two studied basins in the 100 yr event show an anticipated increase of 130 (041) and 150 cfs (042) which totals an anticipated additional release of 280 cfs to fountain creek above the basins existing runoff. Therefore the subject site should be allowed to discharge approximately 50% of the combined developed runoff increase of 140 cfs and 110 cfs in the 100-yr and 10 yr events respectively. An addition of The Vinyard Commerce Park allowable flow proportional to percent coverage of basins 041 and 042, yields allowable increase of discharge for the subject site of 109-cfs (10-year) and 139-cfs (100-year). This is a reasonable method for

determining the allowable developed discharge from the subject site as historic and developed condition CN values assumed for basins 041 and 042 are respectively uniform, and the slopes, ground characteristics, and soil classifications are similar. The similarity in the basins, and existing and development in-line with projected uses in the original flow to be ascertained in direct proportion to acreage, as meaningful variations in CN number and time of concentration within the basins are effectively eliminated.

Comparing the discharge points from the site under Existing and Developed conditions, shows that the increase in discharge from the site is within the limits identified in the SDBOS.

Comparing Design Point EX-B (Existing) to the Design Point F (Developed) we see a slight decrease in flow to the same location with the development of the site. This decrease is primarily due to the requirement of detention within the Harrison Filing No 17 and a portion of the existing runoff being redirected from directly releasing into Fountain Creek to the proposed pond at the south end of the site.

When comparing discharge from the southwestern portion of the site, we note that in the existing condition approximately 6.16 acres (EX-3) was diverted to the Sinton Outfall, however in the developed condition that contribution has been reduced to 1.23 acres (Basin P), which yields 6-cfs less in the 5 yr and 12-cfs in the 100 year event.

Since the eastern portion of the site remains undeveloped we see no difference when comparing Basin EX-4 (Design Point EX-E) to that of Basin T (Design Point 28).

Thus the only development related increase in flows at a site discharge point is located at the natural low-point/pond along the southern boundary adjacent to the Sinton Channel. In the existing condition approximately 63 cfs in the 5-yr event and 168 cfs in the 100yr event reach Design Point EX-D. In the developed condition Design Point 27 shows a combined developed runoff of 111 cfs in the 5 yr event and 246 cfs in the 100 yr event, a difference of 48 cfs in the 5-yr event and 78 cfs in the 100. Both of these values correspond to below the previously discussed values of 110 cfs in the 10-yr event and 150 in the 100yr – which would indicate that no detention is required for this site.

Though there are natural limitations to what can be detained on this site, given the water surface elevations for Fountain Creek relative to the existing western channel-bank, the site will detain developed runoff in the most common storm events (5-year) as much as practicable. A Site SCS model will be generated once the concept plan and site layout specifics are approved.

Pond Location/Limitations

As previously mentioned the majority of the developed runoff makes its way overland to the existing golf course pond adjacent to Sinton Channel. Based upon the above assumption regarding no required detention on site, developed runoff from the site should be able to freely discharge however due to existing site topography, natural detention will occur. The natural limitations on detention are the flow-line of the 12" pipe under the Sinton Channel, the north top-of-bank elevation of the Sinton Channel, and the west top-of-bank elevation for Fountain creek in conjunction with the Fountain Creek water surface elevation.

An inspection of the FEMA profile was conducted to determine what storm is contained within the main channel portion of the creek without overtopping the adjacent western channel bank. Flow depths of approximately 7' and 8.8' were found based upon the profile information. The normal flow depths as indicated by the FEMA profile were applied against the channel bank as measurable from the existing aerial topography, at the likely discharge point of the interior detention area. From this information it was determined that the channel 10-yr flow can be contained within its Fountain Creek's existing banks. Anything beyond the 10-year event will result in the western Fountain Creek bank being overtopped, and waters from fountain creek inundating the eastern low parts of the subject property in areas/basins defined in the developed condition as Basins Q and T. Fountain Creek flooding in events greater than the 10-year make any site detention in natural low-points impossible. All 5yr- runoff, however, will be detained to historic discharge and will be detained within the site.

The existing 12" pipe under the Sinton Channel is roughly 4.75-ft below the top of the northerly Sinton Channel bank. The EXISTING maximum flow capable through the pipe with full charge on the pipe, is approximately 8-cfs. There are no reports that specifically Identify a HISTORTIC flow at the low-point north of the channel in the present location of the 12" PVC pipe invert, or any

reports that indicate how the construction of the channel was anticipated to interrupt or change the HISTORIC flow pattern in SDBPS basin 042. The HISTORIC discharge rate from basin 042 is identified in SDBPS as 110-cfs(10-yr) and 200-cfs(100yr). Though the site should be able to detain the 5-year event with a discharge not to exceed the EXISTING maximum discharge from the 12" pipe, there is a case to be made by both the subject property developer and the property owner(s) downstream of the current 12" PVC drain-pipe that additional flow more in keeping with the HISTORIC flows should be allowed to bypass the Sinton Channel. Maximum flows identified above for the existing 12" PVC outfall will not be exceeded with the development of the subject property.

WQCV Pond and Outlet

The top of the northerly channel bank is slightly lower than the northerly bank of the Sinton Channel. Water surface elevations inside Fountain Creek are generally higher than those on-site in terms on natural on-site detention, means that Fountain Creek does not appear to be a viable Water Quality discharge point. Water Quality at the existing southerly golf-course pond/low-point will be provided with a likely discharge point through the Sinton Channel embankment.

Wetlands Mitigation

Walsh Engineering has been contracted to provide a full environmental site study and recommended wetland mitigation as needed based upon the current planned development. Formal recommendations including the size, location, and type of mitigation required will accompany future drainage report submittals.

Improvements to Sinton Channel

Due to grading constraints and the need for an entrance roadway into the site, some additional improvements to this portion of the site are required. The Sinton Channel will be extended to the north along the Frontage Road. The Sinton Channel extension will necessitate some grading in the area previously identified as wetlands mitigation area for the World Arena. Again, the wetlands mitigation previously attempted in this area was unsuccessful so the grading will not disturb viable wetlands, but the disturbed area will need to be replanted or mitigated. The Harrison Outfall Drainage Study by Drexel Barrell, details the current discharge rates reaching the existing Sinton Outfall Channel via the Sinton Outfall and Stratton Basin Storm Sewer System (refer to the drainage map or appendix information regarding details). This channel was modeled for a 100-yr event of 750

cfs. An existing 72" RCP lies underneath the channel which carries a large portion of the developed flow to the condensed portion of the Sinton outfall channel located along the southern boundary *(Plans for the 72" RCP have been, as yet, un-locatable to determine the alignment, grade, and elevation of the existing pipe which will play a large role in determining if the proposed channel extension is a viable solution)*. A proposed box culvert has been sized to route flows underneath the proposed entrance. Depending on the final design of the box culverts under the proposed site entry, the location of the 72" storm pipe, and the slope of the channel, stabilization measures such as rip-rap side-slopes and bottom-width may be necessary. As previously mentioned the relocation of the existing mitigated wetlands is eminent based upon the current concept plan. A formal report provided by Walsh Engineering will implement measures to rectify the loss of these wetlands.

HYDROLOGIC CALCULATIONS

Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and October 1994. Despite the total annexed area combining to encompass 108.576 acres, the Rational Method was used to estimate storm water runoff anticipated from design storms with 5-year and 100-year recurrence interval as the developable area was limited to approximately 60 acres.

EROSION CONTROL PLAN

The City of Colorado Springs Drainage Criteria Manual specifies an Erosion Control Plan and Associated Cost Estimate be submitted with the Final Drainage Report. We respectfully request that the Erosion Control Plan be submitted in conjunction with the Overlot Grading Plan and construction assurances posted prior to obtaining a grading permit.

FLOODPLAIN STATEMENT

A portion of this site is located within a floodplain as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Number 08041C 0741F, and 008041C 0742F, effective date, March 17, 1997 (See Appendix). A LOMR-F will be prepared and submitted to FEMA, based upon the current planned development, which will act to remove a portion of the site from the 100 yr-floodplain (refer to Developed Drainage Map).

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CONSTRUCTION COST OPINION

Vineyard Commerce Park Public Drainage Facilities (Non-Reimbursable)

ITEM	DESCRIPTION	QUANTITY	UNIT COST	COST
1.	4' D-10-R Sump Inlet	2 EACH	$3,000/EA	$ 6,000.00
2.	10' D-10-R Sump Inlet	1 EACH	$5,750/EA	$ 5,750.00
3.	24' D-10-R Sump Inlet	1 EACH	$9,500/EA	$ 9,500.00
4.	8' D-10-R At-grade Inlet	2 EACH	$5,200/EA	$ 10,400.00
5.	2'X2' Area Drain	1 EACH	$3,500/EA	$ 3,500.00
6.	18" RCP Storm Drain	125 LF	$27/LF	$ 3,375.00
7.	24" RCP Storm Drain	100 LF	$36/LF	$ 3,600.00
8.	30" RCP Storm Drain	675 LF	$45/LF	$ 30,375.00
9.	36" RCP Storm Drain	1,275 LF	$60/LF	$ 76,500.00
10.	42" RCP Storm Drain	250 LF	$80/LF	$ 20,000.00
11.	48" RCP Storm Drain	725 LF	$105/LF	$ 76,125.00
12.	2' x 7' x 50' Box Culvert	1 EACH	$18,770/EA	$ 18,770.00
13.	4' x 10'x 50'Box Culvert	2 EACH.	$52,500/EA	$ 105,000.00
14.	225' 20' Riprap Channel	1 EACH	$20,000/LS	$ 20,000.00
15.	525' 20' Riprap Sided Chnl	1 EACH	$25,000/LS	$ 25,000.00
16.	Riprap	350 CY	$40/CY	$ 14,000.00
17.	TYPE I MH	1 EACH	$8,000/EA	$ 16,000.00
18.	TYPE II MH	2 EACH	$5,500/EA	$ 11,100.00
19.	TYPE III MH	1 EACH	$4,500/EA	$ 4,500.00
20.	Pond Outlet Control	1 EACH	$4,000/LS	$ 4,000.00
	SUB-TOTAL			**$463,495.00**
	15% ENGINEERING & CONTINGENCIES			**$ 69,524.25**
	TOTAL			**$533,019.25**

Classic Consulting Engineers & Surveyors cannot and does not guarantee that the construction cost will not vary from these opinions of probable construction costs. These opinions represent our best judgment as design professionals familiar with the construction industry and this development in particular.

DRAINAGE AND BRIDGE FEES

This area lies within Stratton Drainage Basin. Of the 108.56 acres that are currently requested for annexation, only 61.018 acres are planned for development and platting. The year 2007 drainage and bridge fees are as follows:

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Vineyard Commerce Park
Drainage Fees:

$8,886/acre x 61.018 acres	$ 542,205.95
TOTAL	**$542,205.95**

The Stratton Drainage Basin is recognized by the City of Colorado Springs as a Miscellaneous Drainage Basin and thus is subject to only Drainage Fees. Bridge and/or Pond fees are not required.

SUMMARY

All drainage facilities were sized using the current City of Colorado Springs Drainage Criteria and will safely discharges storm water runoff to adequate outfalls. Overall drainage patterns and developed site densities conform to the "Stratton Basin Outfall Study," dated June 9, 2004" by Drexel Barrell. No negative impacts are anticipated to downstream facilities with the development of the subject site and its annexation into the City of Colorado Springs. All swales, public drainage easements and tracts are subject to final designs to determine necessary improvements per final drainage reports. Individual lots are not required to have water quality because this site will be treated by a regional water quality pond.

No individual on-site stormwater quality facilities will be required due to the proposed off-site regional facility to be located east of the development. Both the existing unchanged portion of the Sinton Channel, and proposed improvements and extensions to the Sinton Channel including the dual-box culvert under the proposed entry way shall be owned and maintained by El Paso County. Any additional drainage improvements required with the development of the individual lots will be subject to review by the City of Colorado Springs in subsequent individual drainage reports. No negative impacts are anticipated with the development and annexation of the proposed site.

PREPARED BY:

Classic Consulting Engineers & Surveyors, LLC

Matthew Merritt, P.E.
Project Manager

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REFERENCES

1. City of Colorado Springs/County of El Paso Drainage Criteria Manual dated October 1991.

2. "Drainage Criteria Manual, Volume No. 2," by City of Colorado Springs Engineering Division, dated November 1, 2002.

3. Hydrology Report Stratton Drainage Basin Outfall Study, El Paso County, Colorado," Drexel Barrell & Co., June 9, 1994.

4. "Master Drainage Report for Cheyenne Mountain Center and Final Drainage Report for Cheyenne Mountain Center Filing No. 1 and Cheyenne Meadows Road Colorado Springs, Colorado," Drexel Barrell & Co., dated October 2, 1985.

5. "Master Drainage Plan Harrison Street – I–25 Vicinity Cheyenne Mountain Ranch," by Hartzell – Pfeiffenberger and Associates, Inc. dated November 15, 1973.

6. "Drainage Study for Harrison Creek Basin in Colorado Springs, Colorado," by Drexel Barrell & Co., revised May 27th 1977.

7. "Drainage Conditions at and Recommended Modifications to the Harrison Outfall," by Drexel Barrel & Co., February 12, 1997.

8. "Final Drainage Report for Harrison Park Filing No. 17," by Drexel Barrell & Co., dated December 1998.

9. "Final Drainage Report Sipilovic Subdivsion, Lot 2," by LMCI, Revised August 23, 2001.

10. "Drainage Report and Plan – EMF Subdivision, by Leigh Whitehead & Associates, dated October 10th, 1979.

11. "Drainage Report for Harrison Park Filing No. 11," by Drexel Barrell & Co, dated June 1, 1984.

12. "Drainage Letter – Tranex Subdivision Filing No. 1, A Replat of Lot 1, Harrison Business Park Filing No. 10," by Oliver E. Watts Consulting Engineer, Inc., revised June 12, 2002.

13. "Drainage Letter – American Door Parcel- Tranex Subdivision Filing No. 1," by Oliver E. Watts Consulting Engineer, Inc., dated February 3, 2006.

14. "Final Drainage Report for Colorado Springs Youth Sports Complex, by Drexel Barrell & Co., revised December 1998.

15. "Drainage Report for Harrison Tech Center Filing No. 1," by Berge-Brewer and Assoicates, Inc. dated July 1984.

16. "Preliminary & Final Drainage Report and Plan for World Arena Subdivision Filing No. 1," by Obering Wurth & Associates, revised March 1995.

17. "Preliminary Drainage Report for Colorado Springs World Arena, World Arena Subdivision, Filing No. 4 South Parking Lot Addition, Colorado Springs, Colorado, by LMCI, dated October 30, 2002.

18. "World Arena Subdivision Filing No. 5, Preliminary & Final Drainage Report," by JPS Engineering, dated December 2002.

19. "World Arena Subdivision Filng No.5 Drainage Report Addendum No. 1," by JPS Engineering, dated September 16th, 2002.

20. "Drainage Letter Statement for World Arena Subdivision Filing No. 6," by Terra Nova Engineering, Inc., revised February 23, 2005.

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APPENDIX

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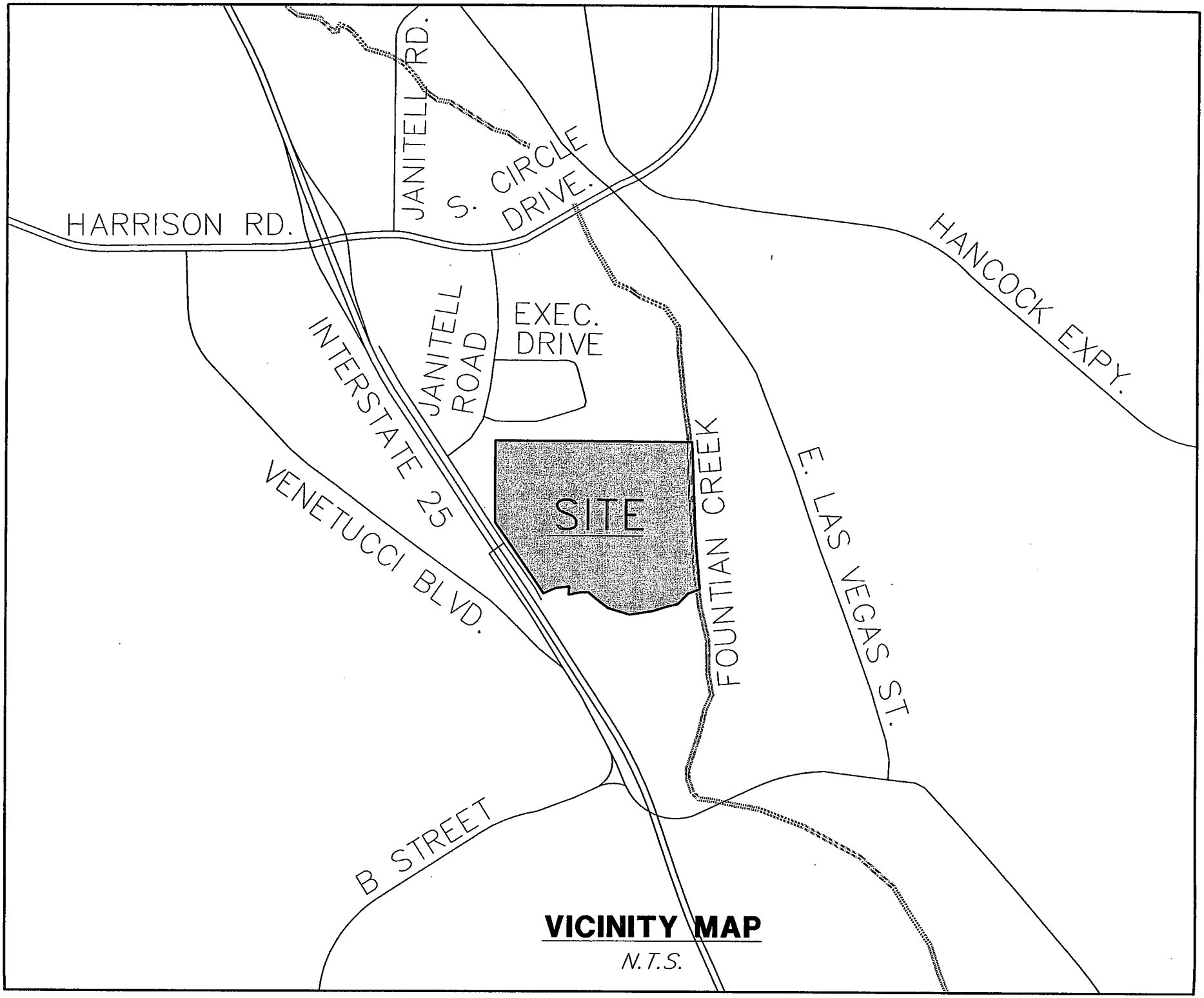
VICINITY MAP



VICINITY MAP

N.T.S.

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SOILS MAP (S.C.S SURVEY)

28-Ellicott "A" 29-EH "B/D" 59-Nunn "C" 82-Schamber "A/C" 101-WT "B"

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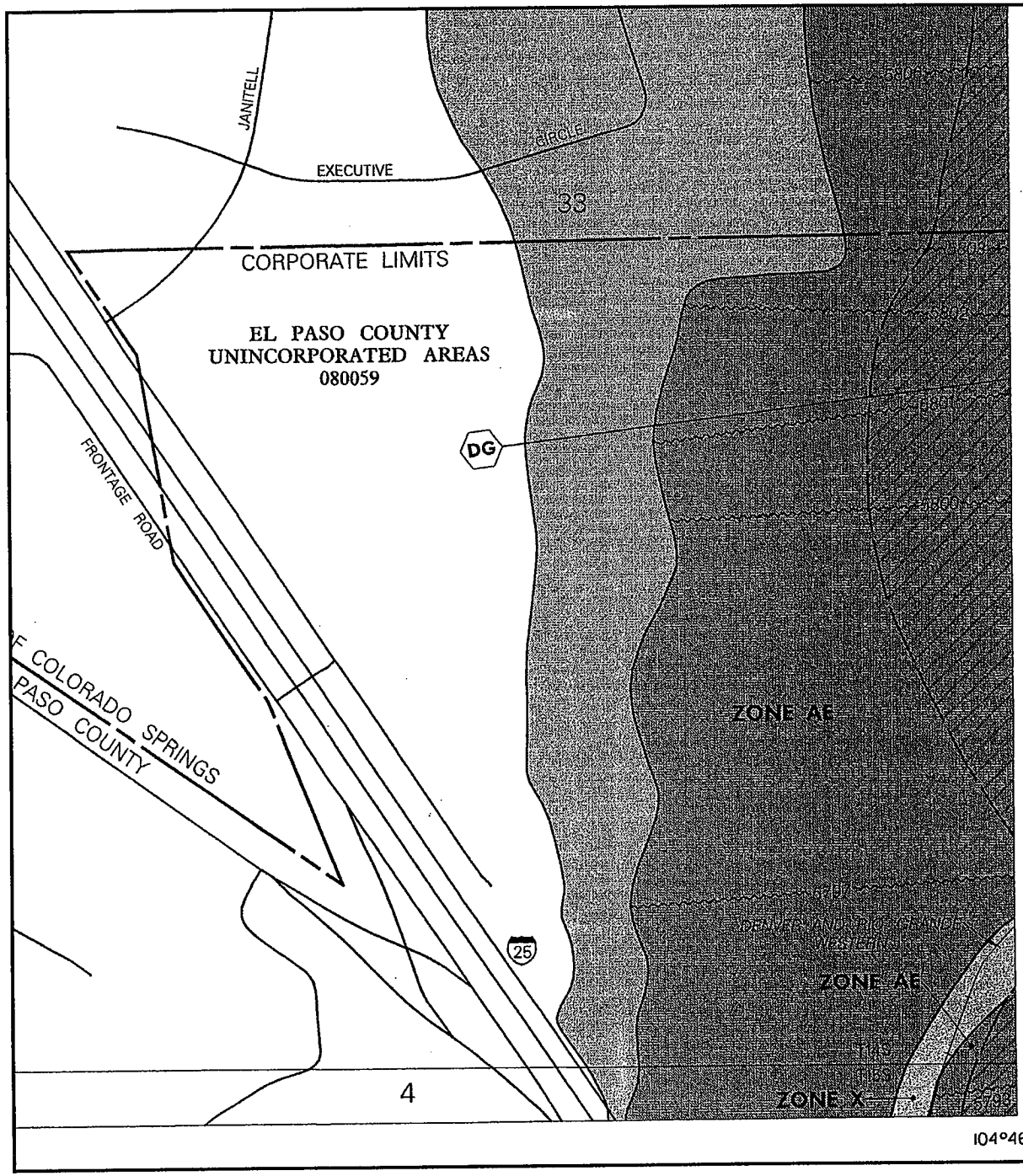
F.E.M.A. MAP



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 741 OF 1300

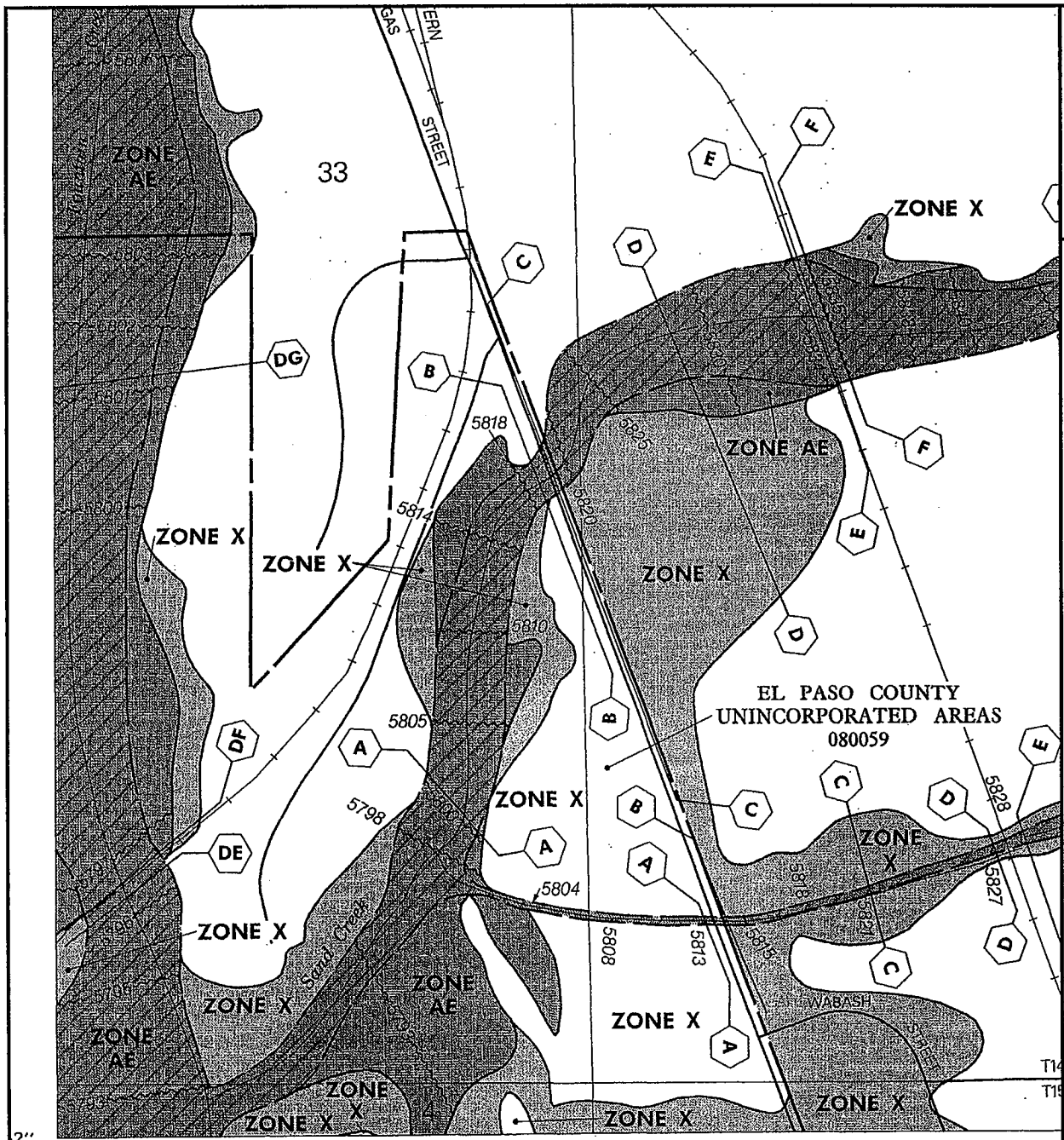
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0741	F
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0741	F

MAP NUMBER
08041C0741 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 742 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0742	F
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0742	F

MAP NUMBER
08041C0742 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency

2"
104°46'52"

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HYDROLOGIC CALCULATIONS

JOB NAME: *VINEYARD COMMERCE PARK*
JOB NUMBER: *2204.00*
DATE: *06/07/07*
CALCULATED BY: *DLM*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

BASIN	TOTAL AREA (AC)	SUB-AREA 1 - DEVELOPED			SUB-AREA 2 - DEVELOPED			UNDEVELOPED/LANDSCAPED 1			UNDEVELOPED/LANDSCAPED 2			WEIGHTED		WEIGHTED CA	
		AREA (AC)	C(5)	C(100)	AREA (AC)	C(5)	C(100)	AREA (AC)	C(5)	C(100)	AREA (AC)	C(5)	C(100)	C(5)	C(100)	CA(5)	CA(100)
A	4.78	1.95	0.75	0.85	0.45	0.75	0.85	1.93	0.25	0.35	0.45	0.30	0.45	0.51	0.61	2.42	2.92
B	0.78	0.70	0.90	0.95	0.00	0.75	0.85	0.08	0.25	0.35	0.00	0.30	0.45	0.83	0.89	0.65	0.69
C	0.32	0.13	0.75	0.85	0.00	0.75	0.85	0.19	0.25	0.35	0.00	0.30	0.45	0.45	0.55	0.14	0.18
D	5.81	4.10	0.75	0.85	1.13	0.75	0.85	0.46	0.25	0.35	0.13	0.30	0.45	0.70	0.80	4.07	4.66
E	2.15	1.75	0.90	0.95	0.00	0.75	0.85	0.40	0.25	0.35	0.00	0.30	0.45	0.78	0.84	1.68	1.80
F	4.90	4.90	0.75	0.95	0.00	0.90	0.95	0.00	0.25	0.35	0.00	0.30	0.45	0.75	0.95	3.68	4.66
G	4.02	3.16	0.75	0.85	0.25	0.75	0.85	0.36	0.25	0.35	0.25	0.30	0.45	0.68	0.78	2.72	3.14
H	3.55	3.30	0.75	0.85	0.00	0.75	0.85	0.00	0.25	0.35	0.25	0.30	0.45	0.72	0.82	2.55	2.92
I	6.22	2.21	0.75	0.85	3.47	0.75	0.85	0.16	0.25	0.35	0.39	0.30	0.45	0.71	0.81	4.41	5.05
J	7.92	0.68	0.75	0.85	6.48	0.75	0.85	0.06	0.25	0.35	0.70	0.30	0.45	0.71	0.81	5.60	6.42
K	4.30	3.78	0.75	0.85	0.00	0.75	0.85	0.00	0.25	0.35	0.52	0.30	0.45	0.70	0.80	2.99	3.45
L	1.69	1.57	0.75	0.85	0.00	0.75	0.85	0.00	0.25	0.35	0.12	0.30	0.45	0.72	0.82	1.21	1.39
M	3.68	1.48	0.75	0.85	2.09	0.90	0.95	0.00	0.25	0.35	0.11	0.30	0.45	0.82	0.89	3.02	3.29
N	2.94	2.79	0.75	0.85	0.00	0.75	0.85	0.00	0.25	0.35	0.15	0.30	0.45	0.73	0.83	2.14	2.44
O	6.14	5.40	0.75	0.85	0.00	0.75	0.85	0.00	0.25	0.35	0.74	0.30	0.45	0.70	0.80	4.27	4.92
P	1.23	0.63	0.75	0.85	0.60	0.90	0.95	0.00	0.25	0.35	0.00	0.30	0.45	0.82	0.90	1.01	1.11
Q	47.56	0.00	0.75	0.85	0.00	0.75	0.85	47.56	0.25	0.35	0.00	0.30	0.45	0.25	0.35	11.89	16.65
R	0.55	0.00	0.75	0.85	0.00	0.75	0.85	0.55	0.25	0.35	0.00	0.30	0.45	0.25	0.35	0.14	0.19
S	0.48	0.00	0.75	0.85	0.00	0.75	0.85	0.48	0.25	0.35	0.00	0.30	0.45	0.25	0.35	0.12	0.17
T	7.51	0.00	0.75	0.85	0.00	0.75	0.85	7.51	0.25	0.35	0.00	0.30	0.45	0.25	0.35	1.88	2.63
OS-A	9.99	8.08	0.90	0.95	1.16	0.25	0.35	0.25	0.25	0.35	0.50	0.30	0.45	0.78	0.84	7.77	8.39
OS-A1	7.47	RESTRICTED FLOW RATE)															
OS-A2	2.52	2.27	0.90	0.95	0.00	0.25	0.35	0.00	0.25	0.35	0.25	0.30	0.45	0.84	0.90	2.12	2.27
OS-B	3.96	1.70	0.30	0.60	1.16	0.25	0.35	0.85	0.25	0.35	0.25	0.30	0.45	0.27	0.46	1.09	1.84
OS-C	0.69	0.00	0.90	0.95	0.00	0.25	0.35	0.00	0.25	0.35	0.69	0.30	0.45	0.30	0.45	0.21	0.31
OS-D	3.29	3.29	0.30	0.60	0.00	0.35	0.45	0.00	0.35	0.45	0.00	0.30	0.45	0.30	0.60	0.99	1.97
OS-E	3.10	3.10	0.30	0.60	0.00	0.35	0.45	0.00	0.35	0.45	0.00	0.30	0.45	0.30	0.60	0.93	1.86
OS-F	3.27	3.27	0.30	0.60	0.00	0.35	0.45	0.00	0.35	0.45	0.00	0.30	0.45	0.30	0.60	0.98	1.96
EX-1	7.98	0.00	0.30	0.60	0.00	0.35	0.45	0.00	0.35	0.45	7.98	0.30	0.45	0.30	0.45	2.39	3.59
EX-2	86.60	0.00	0.30	0.60	0.00	0.35	0.45	0.00	0.35	0.45	86.60	0.30	0.45	0.30	0.45	25.98	38.97
EX-3	6.16	0.00	0.30	0.60	0.00	0.35	0.45	0.00	0.35	0.45	6.16	0.30	0.45	0.30	0.45	1.85	2.77
EX-4	7.78	0.00	0.30	0.60	0.00	0.35	0.45	7.78	0.25	0.35	0.00	0.30	0.45	0.25	0.35	1.95	2.72

JOB NAME: *VINEYARD COMMERCE PARK*
JOB NUMBER: *2204.00*
DATE: *06/07/07*
CALC'D BY: *DLM*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY		TOTAL FLOWS	
	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)
A	2.42	2.92	0.3	75	1.5	10.3	850	1.0%	3.5	4.0	14.4	3.53	6.28	9	18
B	0.65	0.69	0.9	60	1.2	2.3	340	1.0%	3.5	1.6	5.0	5.10	9.07	3	6
C	0.14	0.18	0.9	60	1.2	2.3	50	1.0%	3.5	0.2	5.0	5.10	9.07	1	2
D	4.07	4.66	0.9	60	1.2	2.3	800	2.0%	4.9	2.7	5.0	5.10	9.08	21	42
E	1.68	1.80	0.9	60	1.2	2.3	1200	1.6%	4.4	4.5	6.8	4.68	8.32	8	15
F	3.68	4.66	0.9	60	1.2	2.3	1450	1.4%	4.1	5.8	8.1	4.42	7.85	16	37
G	2.72	3.14	0.9	60	1.2	2.3	850	1.2%	3.8	3.7	6.0	4.86	8.64	13	27
H	2.55	2.92	0.9	60	1.2	2.3	675	1.2%	3.8	2.9	5.2	5.04	8.97	13	26
I	4.41	5.05	0.9	60	1.2	2.3	800	1.0%	3.5	3.8	6.1	4.83	8.59	21	43
J	5.60	6.42	0.9	60	1.2	2.3	750	2.0%	4.9	2.5	5.0	5.10	9.07	29	58
K	2.99	3.45	0.9	60	1.2	2.3	652	2.0%	4.9	2.2	5.0	5.10	9.07	15	31
L	1.21	1.39	0.9	60	1.2	2.3	300	2.0%	4.9	1.0	5.0	5.10	9.07	6	13
M	3.02	3.29	0.9	60	1.2	2.3	1100	2.0%	4.9	3.7	6.0	4.86	8.64	15	28
N	2.14	2.44	0.9	60	1.2	2.3	500	1.3%	3.9	2.1	5.0	5.10	9.07	11	22

JOB NAME:	*VINEYARD COMMERCE PARK*
JOB NUMBER:	*2204.00*
DATE:	*06/07/07*
CALC'D BY:	*DLM*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY		TOTAL FLOWS	
	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)
O	4.27	4.92	0.9	60	1.2	2.3	650	1.5%	4.3	2.5	5.0	5.10	9.07	22	45
P	1.01	1.11	0.9	60	1.2	2.3	0	2.0%	4.9	0.0	5.0	5.10	9.07	5	10
Q	11.89	16.65	0.25	200	2.5	20.9	1900	2.0%	4.9	6.4	27.3	2.56	4.54	30	76
R	0.14	0.19	0.3	50	1	8.4	400	0.9%	3.3	2.0	10.4	4.04	7.18	1	1
S	0.12	0.17	0.3	50	1	8.4	350	0.9%	3.3	1.8	10.2	4.08	7.25	0	1
T	1.88	2.63	0.25	100	1	15.9	0	0.9%	3.3	0.0	15.9	3.37	5.99	6	16
OS-A	7.77	8.39	0.9	75	1.1	2.9	1200	1.0%	3.5	5.7	8.6	4.34	7.72	34	65
OS-A1	3.31	4.14	TC TAKEN FROM HARRISON PARK FILING NO 17 FDR								9.8	4.13	7.35	13.7	30.4
OS-A2	2.12	2.27	0.9	50	1	2.1	350	1.6%	4.4	1.3	5.0	5.10	9.07	11	21
OS-B	1.09	1.84	0.6	60	1	6.1	875	1.6%	4.4	3.3	9.4	4.20	7.46	5	14
OS-C	0.21	0.31	0.3	100	2	11.9	75	1.0%	3.5	0.4	12.3	3.78	6.72	1	2
OS-D	0.99	1.97	0.3	100	1.5	13.1	550	1.5%	4.3	2.1	15.2	3.44	6.11	3	12
OS-E	0.93	1.86	0.3	100	1.5	13.1	450	1.5%	4.3	1.7	14.8	3.48	6.19	3	12
OS-F	0.98	1.96	0.3	100	1.5	13.1	1185	1.0%	3.5	5.6	18.7	3.12	5.54	3	11
EX-1	2.39	3.59	0.25	150	3	15.5	1800	1.1%	3.7	8.2	23.7	2.76	4.91	7	18
EX-2	25.98	38.97	0.25	200	4	17.9	3100	1.5%	4.3	12.1	29.9	2.43	4.31	63	168
EX-3	1.85	2.77	0.25	150	5.5	12.7	900	2.0%	4.9	3.0	15.7	3.39	6.03	6	17
EX-4	1.95	2.72	0.25	100	1	15.9	0	5.3%	8.0	0.0	15.9	3.37	5.99	6.6	16.3

JOB NAME: *VINEYARD COMMERCE PARK*
JOB NUMBER: *2204.00*
DATE: *06/07/07*
CALCULATED BY: *DLM*

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

					Intensity		Flow		
Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	I(5)	I(100)	Q(5)	Q(100)	Inlet Size
1	BASIN OS-A	7.77	8.39	8.6	4.34	7.72	34	65	
*A**	*BASIN OS-A1, BASIN OS-A2*	*5.43*	*6.41*	*10.6*	*4.01*	*7.13*	*22*	*46*	
2	DP-1, BASIN A & OS-B	11.28	13.15	12.1	3.80	6.76	43	89	2X7RCBC
*B**	*DP-A, BASIN A & OS-B*	*8.93*	*11.16*	*14.1*	*3.56*	*6.33*	*32*	*71*	*2X7 RCBC*
3	BASIN B	0.65	0.69	5.0	5.10	9.07	3	6	(2) 4' SUMP
4	DP-2, DP-3	11.93	13.84	12.2	3.79	6.74	45	93	RCBC to 48" RCP
*C**	*DP-B, DP-3*	*9.58*	*11.86*	*14.2*	*3.55*	*6.31*	*34*	*75*	RCBC to 48" RCP
5	DP-4, BASIN C, OS-C	12.28	14.33	12.5	3.75	6.67	46	96	2X2 AREA DRAIN
*D**	*DP-C, BASIN C, OS-C*	*9.93*	*12.17*	*14.5*	*3.52*	*6.25*	*35*	*76*	2X2 AREA DRAIN
6	DP-5. BASIN R & OS-E	13.35	16.38	15.5	3.41	6.06	46	99	TRAP GRASS CHNL
*E**	*DP-D, BASIN R & OS-E*	*11.00*	*14.22*	*17.5*	*3.22*	*5.73*	35	81	*GRASS CHNL*
7	DP-6, BASIN S & OS-F	14.81	18.34	17.0	3.27	5.81	48	106	TRAP GRASS CHNL
*F**	*DP-E, BASIN S & OS-F*	*12.10*	*16.35*	*19.0*	*3.09*	*5.50*	*37*	*90*	*GRASS CHNL*
8	BASIN D	4.07	4.66	5.1	5.08	9.03	21	42	36" PIPE
9	BASIN E	1.68	1.80	6.8	4.68	8.32	8	15	(2) 12' AT-GRADE
10	BASIN F & G, FB DP-9	6.74	8.30	8.1	4.43	7.87	30	65	24' SUMP
11	1/3 BASIN H + OS-D	1.84	2.95	20.0	3.01	5.36	6	16	SURFACE
12	2/3 BASIN H	1.70	1.94	5.2	5.04	8.97	9	17	SURFACE

JOB NAME:	*VINEYARD COMMERCE PARK*
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FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

					Intensity		Flow		
Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	I(5)	I(100)	Q(5)	Q(100)	Inlet Size
13	PR10, DP-11, DP-12	10.27	13.19	20.0	3.01	5.36	31	71	
13A	PR-10, DP-12	8.58	11.24	8.1	4.43	7.87	38	88	STILLING BASIN/CHAN
14	1/2 BASIN I	2.21	2.53	6.1	4.83	8.59	11	22	SURFACE
15	1/2 BASIN I	2.21	2.53	6.1	4.83	8.59	11	22	SURFACE
16	BASIN K	2.99	3.45	5.0	5.10	9.07	15	31	
17	BASIN L	1.21	1.39	5.0	5.10	9.07	6	13	
18	1/2 BASIN J	2.80	3.21	5.0	5.10	9.07	14	29	
19	BASIN M	3.02	3.29	6.0	4.86	8.64	15	28	10' SUMP INLET
20	1/2 BASIN J	2.80	3.21	5.0	5.10	9.07	14	29	
21	PR-16, DP-20	12.82	14.55	8.3	4.39	7.80	56	114	
22	1/2 BASIN O	2.14	2.46	5.0	5.10	9.07	11	22	
23	1/4 BASIN O	1.07	1.23	5.0	5.10	9.07	5	11	WQ POND
24	BASIN N	2.14	2.44	5.0	5.10	9.07	11	22	EXISTING POND
25	PR-17, 1/4 BASIN O	3.20	3.69	7.0	4.64	8.25	15	30	
26	DPS 13A, 14,15,21,22,23,25	32.22	38.23	21.0	2.94	5.23	95	200	
27	BASIN Q + DP-26	44.11	54.88	27.9	2.52	4.49	111	246	
28	BASIN T	1.88	2.63	15.3	3.43	6.10	6	16	
29	BASIN P	1.01	1.11	5.0	5.10	9.07	5	10	SURFACE
EX-A	EX-1, OS-A THRU OS-E	13.38	17.96	23.7	2.76	4.91	37	88	
EX-B	DP-A, BASIN OS-F	14.36	19.93	25.4	2.66	4.73	38	94	
EX-C	EX-3	1.85	2.77	1.0	6.46	11.49	12	32	
EX-D	EX-2	25.98	38.97	29.94	2.43	4.31	63	168	
EX-E	EX-4	1.95	2.72	15.9	3.37	5.99	7	16	

CLASSIC
CONSULTING
ENGINEERS & SURVEYORS

DESIGN CRITERIA

TABLE 5-1

RECOMMENDED AVERAGE RUNOFF COEFFICIENTS AND PERCENT IMPERVIOUS

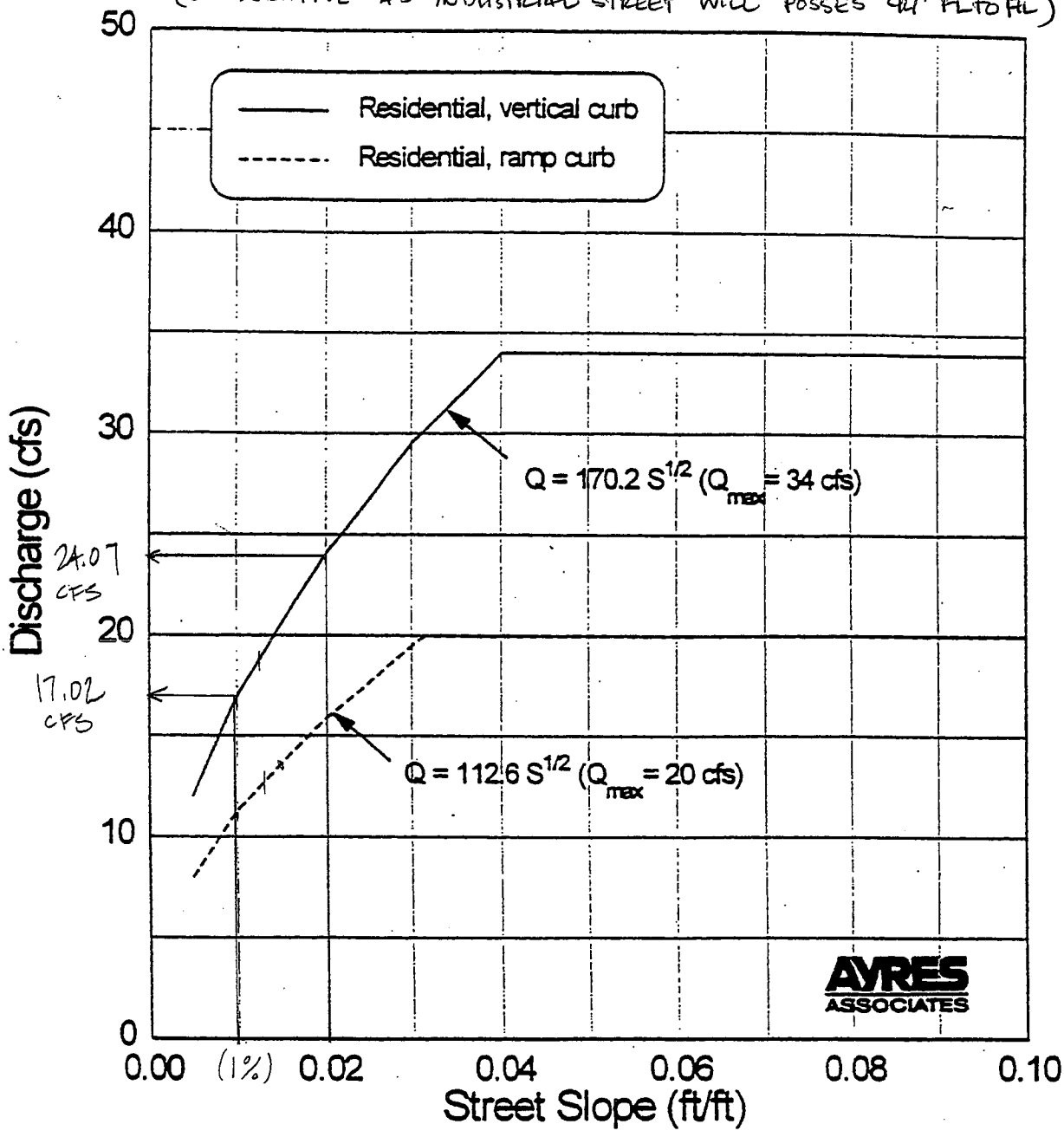
LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	"C" FREQUENCY 10 A&B*	10 C&D*	100 A&B*	100 C&D*
Business					
Commercial Areas	95	0.90	0.90	0.90	0.90
Neighborhood Areas	70	0.75	0.75	0.80	0.80
Residential					
1/8 Acre or less	65	0.60	0.70	0.70	0.80
1/4 Acre	40	0.50	0.60	0.60	0.70
1/3 Acre	30	0.40	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

RESIDENTIAL STREET (34' Flowline to flowline)

(CONSERATIVE AS INDUSTRIAL STREET WILL POSSES 44' FL TO FL)



Interim Release October 12, 1994
City of Colorado Springs

Use this graph to determine the allowable street capacity per side, initial storm, for the typical street section using a 2% crown.

PIPE CAPACITY & ENTRANCE LOSS

PIPE DIA.	AREA S.F.	Q C.F.S	VEL. F.PS.	ENTRANCE LOSS	n	FRICTION SLOPE	INSTALLATION $/LF	COST/ CFS
18	1.77	12	6.79	1.07	0.013	0.013066	25	2.08
18	1.77	15	8.49	1.68	0.013	0.020415	25	1.67
18	1.77	18	10.19	2.42	0.013	0.029398	25	1.39
18	1.77	21	11.88	3.29	0.013	0.040013	25	1.19
18	1.77	24	13.58	4.30	0.013	0.052262	25	1.04
18	1.77	27	15.28	5.44	0.013	0.066145	25	0.93
18	1.77	30	16.98	6.71	0.013	0.081660	25	0.83
24	3.14	20	6.37	0.94	0.013	0.007810	35	1.75
24	3.14	25	7.96	1.47	0.013	0.012203	35	1.40
24	3.14	30	9.55	2.12	0.013	0.017573	35	1.17
24	3.14	35	11.14	2.89	0.013	0.023918	35	1.00
24	3.14	40	12.73	3.78	0.013	0.031240	35	0.88
24	3.14	45	14.32	4.78	0.013	0.039538	35	0.78
24	3.14	50	15.92	5.90	0.013	0.048813	35	0.70
24	3.14	55	17.51	7.14	0.013	0.059064	35	0.64
24	3.14	60	19.10	8.50	0.013	0.070291	35	0.58
30	4.91	30	6.11	0.87	0.013	0.005337	40	1.33
30	4.91	40	8.15	1.55	0.013	0.009489	40	1.00
30	4.91	50	10.19	2.42	0.013	0.014826	40	0.80
30	4.91	60	12.22	3.48	0.013	0.021350	40	0.67
30	4.91	70	14.26	4.74	0.013	0.029060	40	0.57
30	4.91	80	16.30	6.19	0.013	0.037956	40	0.50
30	4.91	90	18.33	7.83	0.013	0.048037	40	0.44
36	7.07	40	5.66	0.75	0.013	0.003584	50	1.25
36	7.07	50	7.07	1.17	0.013	0.005600	50	1.00
36	7.07	60	8.49	1.68	0.013	0.008064	50	0.83
36	7.07	70	9.90	2.28	0.013	0.010976	50	0.71
36	7.07	80	11.32	2.98	0.013	0.014337	50	0.63
36	7.07	90	12.73	3.78	0.013	0.018145	50	0.56
36	7.07	100	14.15	4.66	0.013	0.022401	50	0.50
36	7.07	110	15.56	5.64	0.013	0.027105	50	0.45
36	7.07	120	16.98	6.71	0.013	0.032257	50	0.42
36	7.07	140	19.81	9.14	0.013	0.043906	50	0.36
42	9.62	60	6.24	0.91	0.013	0.003541	70	1.17
42	9.62	70	7.28	1.23	0.013	0.004819	70	1.00
42	9.62	80	8.32	1.61	0.013	0.006294	70	0.88
42	9.62	90	9.35	2.04	0.013	0.007966	70	0.78
42	9.62	100	10.39	2.52	0.013	0.009835	70	0.70
42	9.62	110	11.43	3.04	0.013	0.011900	70	0.64
42	9.62	120	12.47	3.62	0.013	0.014162	70	0.58
42	9.62	130	13.51	4.25	0.013	0.016621	70	0.54
42	9.62	140	14.55	4.93	0.013	0.019276	70	0.50
42	9.62	150	15.59	5.66	0.013	0.022129	70	0.47
42	9.62	160	16.63	6.44	0.013	0.025177	70	0.44
42	9.62	170	17.67	7.27	0.013	0.028423	70	0.41
42	9.62	180	18.71	8.15	0.013	0.031865	70	0.39

PIPE CAPACITY & ENTRANCE LOSS

PIPE DIA.	AREA S.F.	Q C.F.S	VEL. F.PS.	ENTRANCE LOSS	n	FRICTION SLOPE	INSTALLATION $/LF	COST/ CFS
48	12.57	100	7.96	1.47	0.013	0.004821	90	0.90
48	12.57	120	9.55	2.12	0.013	0.006942	90	0.75
48	12.57	140	11.14	2.89	0.013	0.009448	90	0.64
48	12.57	160	12.73	3.78	0.013	0.012341	90	0.56
48	12.57	180	14.32	4.78	0.013	0.015619	90	0.50
48	12.57	200	15.92	5.90	0.013	0.019282	90	0.45
48	12.57	220	17.51	7.14	0.013	0.023331	90	0.41
48	12.57	240	19.10	8.50	0.013	0.027766	90	0.38
48	12.57	260	20.69	9.97	0.013	0.032587	90	0.35
48	12.57	280	22.28	11.56	0.013	0.037793	90	0.32
48	12.57	220	17.51	7.14	0.013	0.023331	90	0.41
54	15.90	180	11.32	2.98	0.013	0.008327	100	0.56
54	15.90	200	12.58	3.68	0.013	0.010280	100	0.50
54	15.90	220	13.83	4.46	0.013	0.012439	100	0.45
54	15.90	240	15.09	5.30	0.013	0.014803	100	0.42
54	15.90	260	16.35	6.22	0.013	0.017373	100	0.38
54	15.90	280	17.61	7.22	0.013	0.020149	100	0.36
54	15.90	300	18.86	8.29	0.013	0.023130	100	0.33
54	15.90	320	20.12	9.43	0.013	0.026317	100	0.31
54	15.90	340	21.38	10.64	0.013	0.029710	100	0.29
60	19.63	220	11.20	2.92	0.013	0.007087	120	0.55
60	19.63	240	12.22	3.48	0.013	0.008434	120	0.50
60	19.63	260	13.24	4.08	0.013	0.009898	120	0.46
60	19.63	280	14.26	4.74	0.013	0.011479	120	0.43
60	19.63	300	15.28	5.44	0.013	0.013178	120	0.40
60	19.63	320	16.30	6.19	0.013	0.014993	120	0.38
60	19.63	340	17.32	6.98	0.013	0.016926	120	0.35
60	19.63	360	18.33	7.83	0.013	0.018976	120	0.33
60	19.63	380	19.35	8.72	0.013	0.021143	120	0.32
60	19.63	400	20.37	9.67	0.013	0.023427	120	0.30
66	23.76	280	11.79	3.24	0.013	0.006900	145	0.52
66	23.76	300	12.63	3.71	0.013	0.007921	145	0.48
66	23.76	320	13.47	4.23	0.013	0.009013	145	0.45
66	23.76	340	14.31	4.77	0.013	0.010175	145	0.43
66	23.76	360	15.15	5.35	0.013	0.011407	145	0.40
66	23.76	380	15.99	5.96	0.013	0.012709	145	0.38
66	23.76	400	16.84	6.60	0.013	0.014082	145	0.36
66	23.76	420	17.68	7.28	0.013	0.015526	145	0.35
66	23.76	440	18.52	7.99	0.013	0.017040	145	0.33
66	23.76	460	19.36	8.73	0.013	0.018624	145	0.32
66	23.76	480	20.20	9.51	0.013	0.020279	145	0.30

PIPE CAPACITY & ENTRANCE LOSS

PIPE DIA.	AREA S.F.	Q C.F.S	VEL. F.PS.	ENTRANCE LOSS	n	FRICTION SLOPE	INSTALLATION $/LF	COST/ CFS
72	28.27	280	9.90	2.28	0.013	0.004336	165	0.59
72	28.27	300	10.61	2.62	0.013	0.004977	165	0.55
72	28.27	320	11.32	2.98	0.013	0.005663	165	0.52
72	28.27	340	12.03	3.37	0.013	0.006393	165	0.49
72	28.27	360	12.73	3.78	0.013	0.007168	165	0.46
72	28.27	380	13.44	4.21	0.013	0.007986	165	0.43
72	28.27	400	14.15	4.66	0.013	0.008849	165	0.41
72	28.27	420	14.85	5.14	0.013	0.009756	165	0.39
72	28.27	440	15.56	5.64	0.013	0.010707	165	0.38
72	28.27	460	16.27	6.17	0.013	0.011703	165	0.36
72	28.27	480	16.98	6.71	0.013	0.012742	165	0.34
72	28.27	500	17.68	7.28	0.013	0.013826	165	0.33
72	28.27	520	18.39	7.88	0.013	0.014955	165	0.32
72	28.27	540	19.10	8.50	0.013	0.016127	165	0.31
72	28.27	560	19.81	9.14	0.013	0.017344	165	0.29
78	33.18	340	10.25	2.45	0.013	0.004170	205	0.60
78	33.18	360	10.85	2.74	0.013	0.004675	205	0.57
78	33.18	380	11.45	3.05	0.013	0.005208	205	0.54
78	33.18	400	12.05	3.38	0.013	0.005771	205	0.51
78	33.18	420	12.66	3.73	0.013	0.006363	205	0.49
78	33.18	440	13.26	4.10	0.013	0.006983	205	0.47
78	33.18	460	13.86	4.48	0.013	0.007632	205	0.45
78	33.18	480	14.47	4.87	0.013	0.008310	205	0.43
78	33.18	500	15.07	5.29	0.013	0.009017	205	0.41
78	33.18	520	15.67	5.72	0.013	0.009753	205	0.39
78	33.18	540	16.27	6.17	0.013	0.010518	205	0.38
78	33.18	560	16.88	6.63	0.013	0.011311	205	0.37
78	33.18	580	17.48	7.12	0.013	0.012134	205	0.35
78	33.18	600	18.08	7.62	0.013	0.012985	205	0.34
78	33.18	620	18.68	8.13	0.013	0.013865	205	0.33
84	38.48	440	11.43	3.04	0.013	0.004701	230	0.52
84	38.48	470	12.21	3.47	0.013	0.005364	230	0.49
84	38.48	500	12.99	3.93	0.013	0.006070	230	0.46
84	38.48	530	13.77	4.42	0.013	0.006821	230	0.43
84	38.48	560	14.55	4.93	0.013	0.007615	230	0.41
84	38.48	590	15.33	5.47	0.013	0.008452	230	0.39
84	38.48	620	16.11	6.05	0.013	0.009334	230	0.37
84	38.48	650	16.89	6.64	0.013	0.010259	230	0.35
84	38.48	680	17.67	7.27	0.013	0.011228	230	0.34
84	38.48	710	18.45	7.93	0.013	0.012240	230	0.32
84	38.48	740	19.23	8.61	0.013	0.013296	230	0.31
84	38.48	770	20.01	9.32	0.013	0.014396	230	0.30

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HYDRAULIC CALCULATIONS

JOB NAME: *VINEYARD COMMERCE PARK*
JOB NUMBER: *2204.00*
DATE: *06/07/07*
CALCULATED BY: *DLM*

* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM GRADE. REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basin/ Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	DP-2	11.28	13.15	12.10	3.80	6.76	43	89	2X7 RCB
2	1/2 DP-3	0.33	0.35	5.0	5.10	9.07	2	3	18" RCP
3	DP-3	0.65	0.69	5.1	5.08	9.03	3	6	18" RCP
4	PR-1, PR-3	11.93	13.84	12.2	3.79	6.74	45	93	48" RCP
5	DP-5	12.28	14.33	12.5	3.75	6.67	46	96	48" RCP
6	DP-8	4.07	4.66	5.1	5.08	9.03	21	42	36" RCP
7	1/2 DP-9	0.84	0.90	6.8	4.68	8.32	4	7	18" RCP
8	DP-9	1.68	1.80	6.8	4.68	8.32	8	15	24" RCP
9	PR-6, PR-8	5.75	6.46	6.8	4.68	8.33	27	54	36" RCP
10	PR-9, DP-10	12.49	14.76	8.1	4.43	7.87	55	116	48" RCP
11	DP-16	2.99	3.45	5.0	5.10	9.07	15	31	30" RCP
12	DP-17	1.21	1.39	5.0	5.10	9.07	6	13	24" RCP
13	PR-11, PR-12	4.20	4.84	5.2	5.05	8.98	21	43	36" RCP
14	DP-18	2.80	3.21	5.0	5.10	9.07	14	29	30" RCP
15	PR-13, PR-14	7.00	8.05	6.8	4.68	8.33	33	67	42" RCP
16	PR-15, DP-19	10.03	11.34	7.4	4.56	8.11	46	92	48" RCP
17	DP-19	2.14	2.46	5.0	5.10	9.07	11	22	30" RCP

JOB NAME:	*VINEYARD COMMERCE PARK*
JOB NUMBER:	*2204.00*
DATE:	*6/7/2007*
CALCULATED BY:	*DLM*

DESIGN POINT 3

FLOW SPLIT BETWEEN INLETS
maximum flow int. per inlet w/Parliament

Total Flow: Q_5 = 1.5 cfs
Q_{100} = 3 cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 1.00 (dmax)

Qi = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: [4] foot inlet required

100-Year Event: [4] foot inlet required

EXISTING [4] FT D-10-R INLET TO ACCEPT BOTH 5YR & 100 YR DEVELOPED FLOWS AT THIS DESIGN POINT.

JOB NAME:	*VINEYARD COMMERCE PARK*
JOB NUMBER:	*2204.00*
DATE:	*6/7/2007*
CALCULATED BY:	*DLM*

DESIGN POINT 10

Total Flow: Q_5 = 30 cfs

Q_{100} = 65 cfs

Maximum allowable ponding depth at sump:

D_5 = 0.53

D_{100} = 1.00 (dmax)

Qi = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: 24 foot inlet required

100-Year Event: 22 foot inlet required

EXISTING 24 FT D-10-R INLET TO ACCEPT BOTH 5YR & 100 YR DEVELOPED FLOWS AT THIS DESIGN POINT.

JOB NAME:	*VINEYARD COMMERCE PARK*
JOB NUMBER:	*2204.00*
DATE:	*6/7/2007*
CALCULATED BY:	*DLM*

DESIGN POINT 19

Total Flow: Q_5 = 15 cfs

Q_{100} = 28 cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 1.00 (dmax)

Qi = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event:	10	foot inlet required
100-Year Event:	6	foot inlet required
EXISTING	10	FT D-10-R INLET TO ACCEPT BOTH 5YR & 100 YR DEVELOPED FLOWS AT THIS DESIGN POINT.

JOB NAME:	*VINEYARD COMMERCE PARK*
JOB NUMBER:	*2204.00*
DATE:	*06/07/07*
CALCULATED BY:	*DLM*

TOTAL FLOW = 7 AND 15

1/2 OF FLOW AT DP-9 3.5 7.5

DESIGN POINT 9 **100 YEAR FLOW**

Q(100)	7	I(100)	8.3		
DEPTH	0.31	Fr	1.52	Inlet size ? L(i) =	8
SPREAD	9.0	L(1)	10.6	If Li < L(2) then Qi =	5.7
CROSS SLOPE	2.0%	L(2)	6.3	If Li > L(2) then Qi =	4.9
STREET SLOPE	1.7%	L(3)	22.6	FB =	2
				CA(eqv.)=	0.25

5 YEAR FLOW

Q(5)	3.5	I(5)	4.7		
DEPTH	0.26	Fr	1.43	Inlet size ? L(i) =	8
SPREAD	6.8	L(1)	7.4	If Li < L(2) then Qi =	3.8
CROSS SLOPE	2.0%	L(2)	4.5	If Li > L(2) then Qi =	2.7
STREET SLOPE	1.7%	L(3)	15.9	FB =	0.80
				CA(eqv.)=	0.17

JOB NAME: *VINEYARD COMMERCE PARK*
JOB NUMBER: *2204.00*
DATE: *6/7/2007*
CALCULATED BY: *DLM*

BASIN C/OS-C

Total Flow: Q(5) = 1 cfs
Q(100) = 2 cfs

Maximum allowable ponding depth at sump:

D(5) = 0.50 (d)
D(100) = 0.67 (dmax)

Qi = [(3.0)(P)(d1.5)]/F (Weir Conditions)

Clogging Factor (F) = 2.0

5-Year Event: 1.9 foot perimeter required

100-Year Event: 2.4 foot perimeter required

INSTALL A PUBLIC 3 FT D-9 INLET TO ACCEPT BOTH 5YR & 100 YR DEVELOPED FLOWS AT THIS DESIGN POINT.

SECTION A-A - 90 CFS

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.00900	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	90.00	ft^3/s

Results

Normal Depth	1.30	ft
Flow Area	19.77	ft^2
Wetted Perimeter	20.72	ft
Top Width	20.40	ft
Critical Depth	1.16	ft
Critical Slope	0.01396	ft/ft
Velocity	4.55	ft/s
Velocity Head	0.32	ft
Specific Energy	1.62	ft
Froude Number	0.82	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.30	ft
Critical Depth	1.16	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.01396	ft/ft

SECTION B-B - 110 CFS

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.00900	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	110.00	ft^3/s

Results

Normal Depth	1.44	ft
Flow Area	22.80	ft^2
Wetted Perimeter	21.91	ft
Top Width	21.56	ft
Critical Depth	1.30	ft
Critical Slope	0.01354	ft/ft
Velocity	4.82	ft/s
Velocity Head	0.36	ft
Specific Energy	1.81	ft
Froude Number	0.83	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.44	ft
Critical Depth	1.30	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.01354	ft/ft

SECTION C-C - 750

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.056	
Channel Slope	0.00900	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	20.00	ft
Discharge	750.00	ft^3/s

Results

Normal Depth	4.12	ft
Flow Area	150.47	ft^2
Wetted Perimeter	54.00	ft
Top Width	52.99	ft
Critical Depth	2.88	ft
Critical Slope	0.03640	ft/ft
Velocity	4.98	ft/s
Velocity Head	0.39	ft
Specific Energy	4.51	ft
Froude Number	0.52	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.12	ft
Critical Depth	2.88	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.03640	ft/ft

SECTION D-D - 750 CFS

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.045	
Channel Slope	0.00900	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	20.00	ft
Discharge	750.00	ft^3/s

Results

Normal Depth	3.69	ft
Flow Area	128.43	ft^2
Wetted Perimeter	50.46	ft
Top Width	49.55	ft
Critical Depth	2.88	ft
Critical Slope	0.02351	ft/ft
Velocity	5.84	ft/s
Velocity Head	0.53	ft
Specific Energy	4.22	ft
Froude Number	0.64	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.69	ft
Critical Depth	2.88	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.02351	ft/ft

SECTION E-E - 90 CFS

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.00500	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	90.00	ft^3/s

Results

Normal Depth	1.52	ft
Flow Area	24.37	ft^2
Wetted Perimeter	22.51	ft
Top Width	22.13	ft
Critical Depth	1.16	ft
Critical Slope	0.01396	ft/ft
Velocity	3.69	ft/s
Velocity Head	0.21	ft
Specific Energy	1.73	ft
Froude Number	0.62	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.52	ft
Critical Depth	1.16	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01396	ft/ft

SECTION F-F - 115 CFS

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.00500	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	115.00	ft^3/s

Results

Normal Depth	1.72	ft
Flow Area	29.06	ft^2
Wetted Perimeter	24.19	ft
Top Width	23.77	ft
Critical Depth	1.33	ft
Critical Slope	0.01345	ft/ft
Velocity	3.96	ft/s
Velocity Head	0.24	ft
Specific Energy	1.96	ft
Froude Number	0.63	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.72	ft
Critical Depth	1.33	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01345	ft/ft

SECTION G-G - OPT #1 - 30cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.01000	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	4.00	ft
Discharge	30.00	ft^3/s

Results

Normal Depth	1.00	ft
Flow Area	8.03	ft^2
Wetted Perimeter	12.27	ft
Top Width	12.02	ft
Critical Depth	0.89	ft
Critical Slope	0.01589	ft/ft
Velocity	3.74	ft/s
Velocity Head	0.22	ft
Specific Energy	1.22	ft
Froude Number	0.81	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	0.89	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.01589	ft/ft

CHASE SECTION G-G OPT2 - 30CFS

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Bottom Width	5.00	ft
Discharge	30.00	ft^3/s

Results

Normal Depth	0.75	ft
Flow Area	3.77	ft^2
Wetted Perimeter	6.51	ft
Top Width	5.00	ft
Critical Depth	1.04	ft
Critical Slope	0.00386	ft/ft
Velocity	7.95	ft/s
Velocity Head	0.98	ft
Specific Energy	1.74	ft
Froude Number	1.61	
Flow Type	Supercritical	

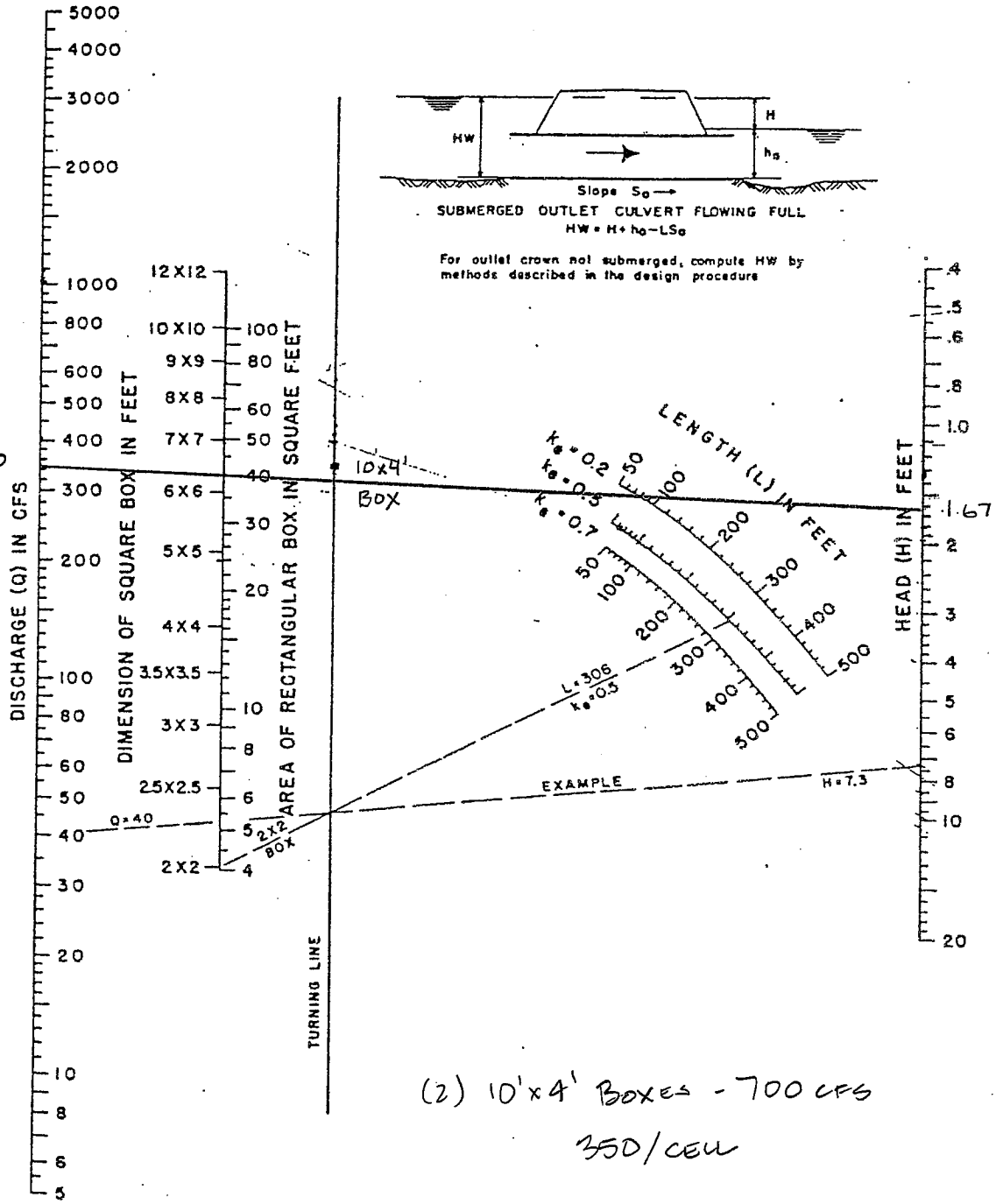
GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.75	ft
Critical Depth	1.04	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00386	ft/ft

CHART 8



(2) 10'x4' Boxes - 700 CFS

350/CELL

HEAD FOR
CONCRETE BOX CULVERTS
FLOWING FULL
n = 0.012

BUREAU OF PUBLIC ROADS JAN. 1963

PROPOSED
EXTENDED SINTON CHANNEL

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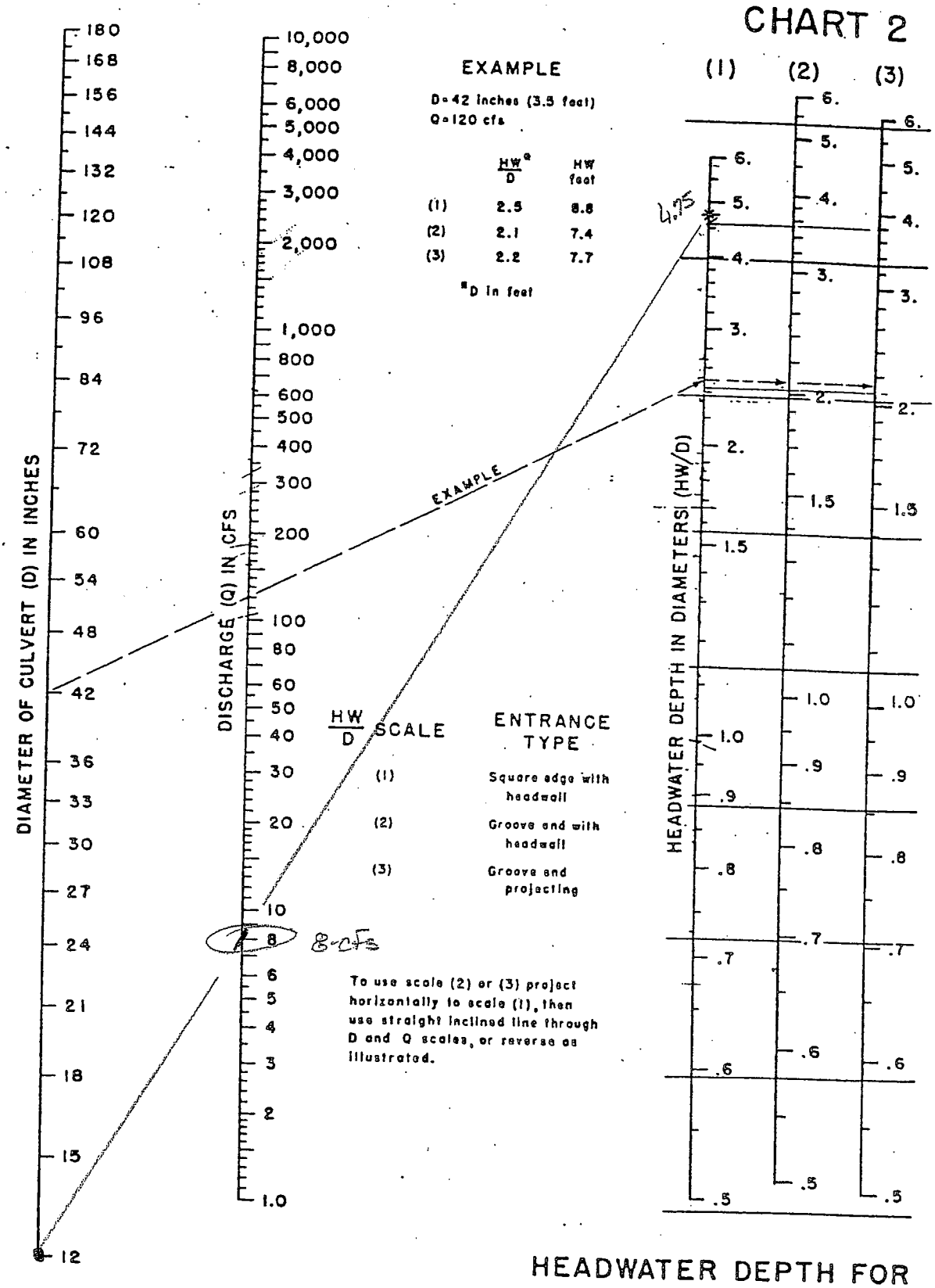
12" PVC EVALUATION

CHART 2



EXAMPLE

D = 42 inches (3.5 feet)
Q = 120 cfs

	$\frac{HW}{D}$	HW feet
(1)	2.5	8.8
(2)	2.1	7.4
(3)	2.2	7.7

*D in feet

$\frac{HW}{D}$ SCALE — ENTRANCE TYPE

(1) Square edge with headwall

(2) Groove end with headwall

(3) Groove end projecting

To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through D and Q scales, or reverse as illustrated.

HEADWATER SCALES 283
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

(PVC: No Discernable Diff.)

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STRATTON DRAINAGE
BASIN STUDY INFORMATION

SUMMARY OF HYDROLOGIC PARAMETERS
STRATTON DRAINAGE BASIN OUTFALL STUDY
EL PASO COUNTY, COLORADO

BASIN	DRAINAGE AREA (SQ. MI.)	TIME OF CONC. (HR.)	HISTORIC CN	DEVELOPED CN
044	0.104	0.44	74.5	74.5
045	0.083	0.33	74.5	74.5
01	0.135	0.22	74.5	74.5
02	0.063	0.30	79.6	79.6
001	0.116	0.40	72.0	76.2
002	0.093	0.20	79.0	79.0
003	0.100	0.10	79.0	79.0
004	0.068	0.20	71.0	81.0
005	0.061	0.20	77.0	92.0
046	0.102	0.29	76.0	80.1
05	0.169	0.40	76.0	80.1
061	0.034	0.15	85.0	85.0
006	0.159	0.40	81.0	88.0
008	0.116	0.40	81.0	85.0
009	0.147	0.40	81.0	81.0
21	0.139	0.26	84.0	88.0
20	0.103	0.27	84.0	88.0
021	0.076	0.40	87.0	94.0
024	0.081	0.30	79.0	94.0
022	0.125	0.10	79.0	94.0
040	0.224	0.48	88.8	89.5
041	0.198	0.57	76.7	87.1
042	0.135	0.50	78.2	93.8
043	0.039	0.23	84.0	88.0

← PROPOSED VINEYARD COMMERCE PARK LIES WITHIN BASINS 041 AND 042

* "HYDROLOGY REPORT STRATTON DRAINAGE BASIN OUTFALL STUDY", JUNE 1994, BY DREXEL BARRELL

STRATTON DRAINAGE BASIN OUTFALL STUDY
SUMMARY OF DISCHARGES FOR BASINS/DESIGN POINTS

BASIN/DESIGN POINT	DRAINAGE AREA (AC.)	PROPOSED CONDITIONS				EXISTING CONDITIONS			
		2-HR. STORM		24-HR. STORM		2-HR. STORM		24-HR. STORM	
		10-YR.	100-YR.	10-YR	100-YR.	10-YR.	100-YR.	10-YR.	100-YR
DRAINAGE BASINS									
001	0.116	80	190	90	180	70	170	70	150
002	0.093	110	230	120	210	110	230	120	210
003	0.100	140	280	140	240	140	280	140	240
004	0.068	90	180	90	160	50	130	50	110
005	0.061	120	200	130	190	70	140	70	130
006	0.159	200	360	230	380	150	300	170	300
008	0.116	130	250	150	250	110	220	120	210
009	0.147	140	280	150	270	140	280	150	270
01	0.135	120	270	130	250	120	270	130	250
02	0.063	60	130	70	130	60	130	70	130
021	0.076	110	190	140	210	90	170	110	170
022	0.125	330	500	300	430	180	360	170	300
024	0.081	140	230	170	250	80	170	90	160
040	0.224	260	470	320	520	250	460	310	500
041	0.198	190	360	230	380	120	270	130	250
042	0.135	170	300	230	350	100	210	110	200
043	0.039	60	110	70	110	60	100	60	100
044	0.104	70	150	70	140	70	150	70	140
045	0.083	60	140	70	130	60	140	70	130
046	0.102	110	220	120	210	90	200	90	180
05	0.169	150	320	170	300	120	280	130	260
061	0.034	60	110	60	90	60	110	60	90
20	0.103	160	280	180	280	140	260	150	250
21	0.139	220	390	240	380	190	360	200	340
DESIGN POINTS									
1	0.40	290	660	470	640	240	570	270	560
2	0.76	220	500	230	520	190	470	210	470
3	0.82	320	670	330	690	250	580	240	580
4	1.29	490	1010	550	1070	380	880	390	870
5	2.07	900	1970	1060	1920	720	1710	710	1560
6 (INFLOW)	0.32	190	430	190	390	190	430	190	390
6 (OUTFLOW)	0.32	80	360	30	260	80	360	30	260
7	0.16	110	230	120	220	110	230	120	220
8	0.44	90	330	100	200	90	320	80	190
9	0.69	250	530	270	510	250	520	260	490
10	0.27	250	520	280	500	200	460	220	430

PROPOSED VINEYARDS COMMERCE PARK LIES WITHIN BASINS 041 AND 042

* "HYDROLOGY REPORT STRATTON DRAINAGE BASIN OUTFALL STUDY", JUNE 1994, BY DREXEL BARRELL

Project STRATTON DRAINAGE BASIN OUTFALL STUDY | Job No CE-7052

Client EL PASO CO. | By RM | Date REV. 6/9/94 5/9/94

BASIN 041

D.A. = 0.198 SQ. MI. (126.7 AC.)

	CN EX	CN DEV.
LAND USE/SOILS: 14 AC. RES A/B (USE B)	69	75
5 AC. RES D	84	87
84.7 AC. IND. A/B (USE B) (1/3 DEV. 2/3 RANGE EX)	75.3	88
23 AC. IND C (EX ≈ 1/2 DEV. ≈ 1/2 RANGE)	85	91

$$CN\ (EX.) = \frac{14(69) + 5(84) + 84.7(75.3) + 23(85)}{126.7} = 76.7$$

$$CN\ (DEV.) = \frac{14(75) + 5(87) + 84.7(88) + 23(91)}{126.7} = 87.1$$

USE 89

T_c: T_i: L=300' S=2% T_i= 6 MIN.

T_T: L= 3000' SWALE S=1.7%

USE V=2.5 (ASSUME FUTURE PAVED O/L)

$T_T = 3000/60(2.5) = 20.0$ MIN.

T_T: L=1200 S=1.7 V=2.5

$T_T = 1200/60(2.5) = 8.0$

$T_c = 6.0 + 20.0 + 8.0 = 34.0$ MIN. = 0.57 HR.

CCES NOTE: 14AC + 5AC + 84.7AC. + 23.AC = 126.7AC

107.7 (84.7+23) HAVE BEEN PLANNED FOR INDUSTRIAL DEVELOPMENT OF THE TOTAL AMOUNT OF 126.7 A PERCENTAGE OF 0.85. WITH THE REMAINING 15% LEFT FOR RESIDENTIAL, BASED UPON OUR DEVELOPMENT AND THE EXISTING DEVELOPMENT IN THE AREA APPROX. 22% WILL BE LEFT UNDEVELOPED (BELOW PLANNED CN VALUES) IS THIS NO DETENTION SHOULD BE REQUIRED

4840 PEARL EAST CIRCLE, SUITE 114 [303] 442-4338
BOULDER, COLORADO 80301

740 WOOTEN RD. #108 [719] 591-5151
COLORADO SPRINGS, COLORADO 80915

STRATTON DRAINAGE BASIN OUTFALL STUDY — Job No CE7052

FOR EL PASO CO. — By RM — Date REV. 6/9/94 5/9/94

BASIN 042

D.A. = 0.135 SQ. MI. (86.4 AC.)

SOILS/LAND USE: "C" SOILS — 8 AC. IND. - D; 11 AC. IND. - A (USE B); 67.4 AC. IND. - C

EX. UND. (RANGE FAIR)

$$\text{EX. CN.} = \frac{8(84)+11(69)+67.4(79)}{86.4} = 78.2$$

$$\text{DEV. CN.} = \frac{8(95)+11(92)+67.4(94)}{86.4} = 93.8$$

T_c: L = 300' S = 3%

$T_i = 5$

T_t: L = 3000' @ 1%
ASSUME SHAL. GUTTER/SHT. FLOW
2) FUT. DEV.

V = 2 FPS

$T_t = 3000/60(2) = 25$

$T_c = 5+25 = 30$ MIN. = 0.5 HRS.

CCES NOTE: 8AC + 11AC. + 67.4AC. = 86.4 AC. OF WHICH ALL HAS BEEN PLANNED FOR INDUSTRIAL DEVELOPMENT. WITH THE IMPLEMENTATION OF OUR SITE AND THOSE EXISTING DEVELOPMENTS LESS THAN 1/2 THE TOTAL BASIN WILL BE DEVELOPED AT OR BELOW ITS EXPECTED DENSITY. THUS NO DETENTION SHOULD BE REQUIRED WITH THIS PROPOSED DEVELOPMENT.

to be **218 cfs** at the Harrison Box Culvert (See Figure 3). The Harrison system would easily handle the 218 cfs flow to and through the box with no flow to be diverted to the south in the I-25 frontage road.

In March of 1995, an extension of the December, 1994 Master Plan was prepared. This report titled, **"Preliminary Drainage Study vs. Highway 85/87 (Venetucci Boulevard) and State Highway 29 (Lake Avenue) Colorado Springs, Colorado"**, shows the 5 year flows based on the latest City criteria. The 5 year flow at the Harrison Box, (based on the City 's latest criteria) is calculated to be **330 cfs** (See Figure 6).

In the 1994 Plan, the smaller more frequent event flows from the Harrison Basin would begin flowing through the box. The plan showed a weir and a "Box" inlet which would allow runoff to flow south along the Frontage Road. The weir releasing to the south (to the Frontage Road) was set at elevation 5857.1 ft. Thus, flow in the Harrison Box would be **140 cfs** when flow into the Sinton System at the frontage road started. This occurred at approximately time equaling 1.30 hours into the 100 year storm event. It is important to note although flows lag 1.3 hours, the 290 cfs peak flow still occurs at 6.1 hours into the storm event.

Following is a summary table of the various 100 year peak flows and times of peaks for both Sinton and Harrison under the 1994 plan.

Location	1994 Existing Conditions 100 YR Q (cfs)	1994 Existing Conditions Time to Peak (Hours)	1994 Master Plan Q (cfs)	1994 Master Plan time to Peak (Hours)
Sinton in Pipe	-	-	610	6.2
Sinton in Box	1920	6.3	750	6.2
TOTAL:	1920	-	1360	-
Harrison Box	350	6.1	350	6.1
Harrison South	290	6.1	290	6.1

Appendix "C" consists of select TR-20 sheets which were copied from the 1994 Master Plan.

CLASSIC
CONSULTING
ENGINEERS & SURVEYORS

FLOOD PROFILES

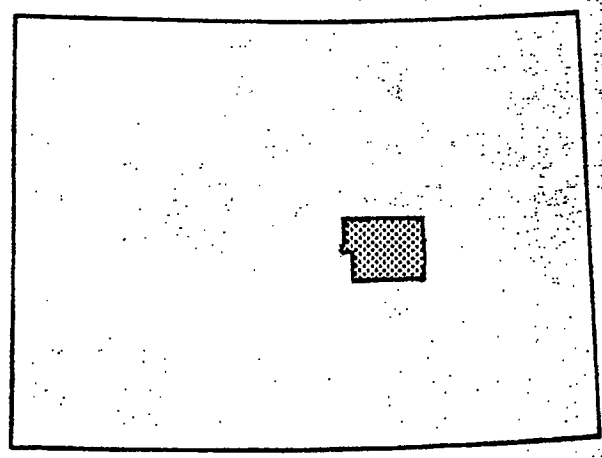
FLOOD INSURANCE STUDY

C7676 - EL PASO COUNTY CRIMINAL JUSTICE CENTER

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

VOLUME 2 OF 4

COMMUNITY NAME	COMMUNITY NUMBER
CALHAN, TOWN OF	080192
COLORADO SPRINGS, CITY OF	080060
EL PASO COUNTY, UNINCORPORATED AREAS	080059
FOUNTAIN, CITY OF	080061
GREEN MOUNTAIN FALLS, TOWN OF	080062
MANITOU SPRINGS, CITY OF	080063
MONUMENT, TOWN OF	080064
PALMER LAKE, TOWN OF	080065
RAMAH, TOWN OF	080066



REVISED: MARCH 17, 1997

Federal Emergency Management Agency

A-17

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Fountain Creek (Cont'd)								
DA	131,113	310	4,765	12.0	5,780.7	5,780.7	5,780.8	0.1
DB	131,149	310	4,967	11.5	5,781.4	5,781.4	5,781.5	0.1
DC	131,449	770	8,518	6.7	5,782.9	5,782.9	5,783.0	0.1
DD	133,059	790	4,832	11.8	5,788.8	5,788.8	5,788.8	0.0
DE	134,399	330	3,464	13.9	5,796.4	5,796.4	5,796.4	0.0
DF	134,420	330	3,719	12.9	5,796.5	5,796.5	5,797.5	1.0
DG	135,998	800	5,313	9.0	5,801.2	5,801.2	5,801.5	0.3
DH	138,750	450	3,613	13.3	5,816.3	5,816.3	5,816.7	0.4
DI	139,725	186	2,358	20.4	5,823.8	5,823.8	5,823.8	0.0
DJ	139,810	196	2,919	16.4	5,825.7	5,825.7	5,826.7	1.0
DK	141,320	550	4,195	11.4	5,833.1	5,833.1	5,833.1	0.0
DL	142,485	400	3,256	14.7	5,838.4	5,838.4	5,838.4	0.0
DM	143,375	400	2,741	17.5	5,843.5	5,843.5	5,843.7	0.2
DN	143,400	400	4,050	11.9	5,846.4	5,846.4	5,847.4	1.0
DO	144,977	680	2,815	11.2	5,855.0	5,855.0	5,855.0	0.0
DP	146,097	1,100	5,921	7.8	5,859.4	5,859.4	5,860.2	0.8
DQ	147,737	275	2,815	15.9	5,872.5	5,872.5	5,872.5	0.0
DR	149,455	550	3,737	12.0	5,884.0	5,884.0	5,884.3	0.3
DS	150,815	400	3,312	13.5	5,891.6	5,891.6	5,891.9	0.3
DT	152,165	800	5,297	8.5	5,903.0	5,903.0	5,903.0	0.0
DU	152,995	260	2,733	16.4	5,905.9	5,905.9	5,906.3	0.4
DV	153,050	290	3,100	14.4	5,907.2	5,907.2	5,907.6	0.4
DW	153,250	280	3,472	12.9	5,910.2	5,910.2	5,910.2	0.0
DX	153,508	280	2,462	17.2	5,910.2	5,910.2	5,910.2	0.0
DY	153,550	280	2,975	14.2	5,910.2	5,910.2	5,910.4	0.2
DZ	154,850	340	2,806	15.0	5,918.1	5,918.1	5,918.1	0.0

[1]Feet Above Fountain Creek Mile 21.0

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

EL PASO COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

FOUNTAIN CREEK

Table 3. Summary of Discharges (Cont'd)

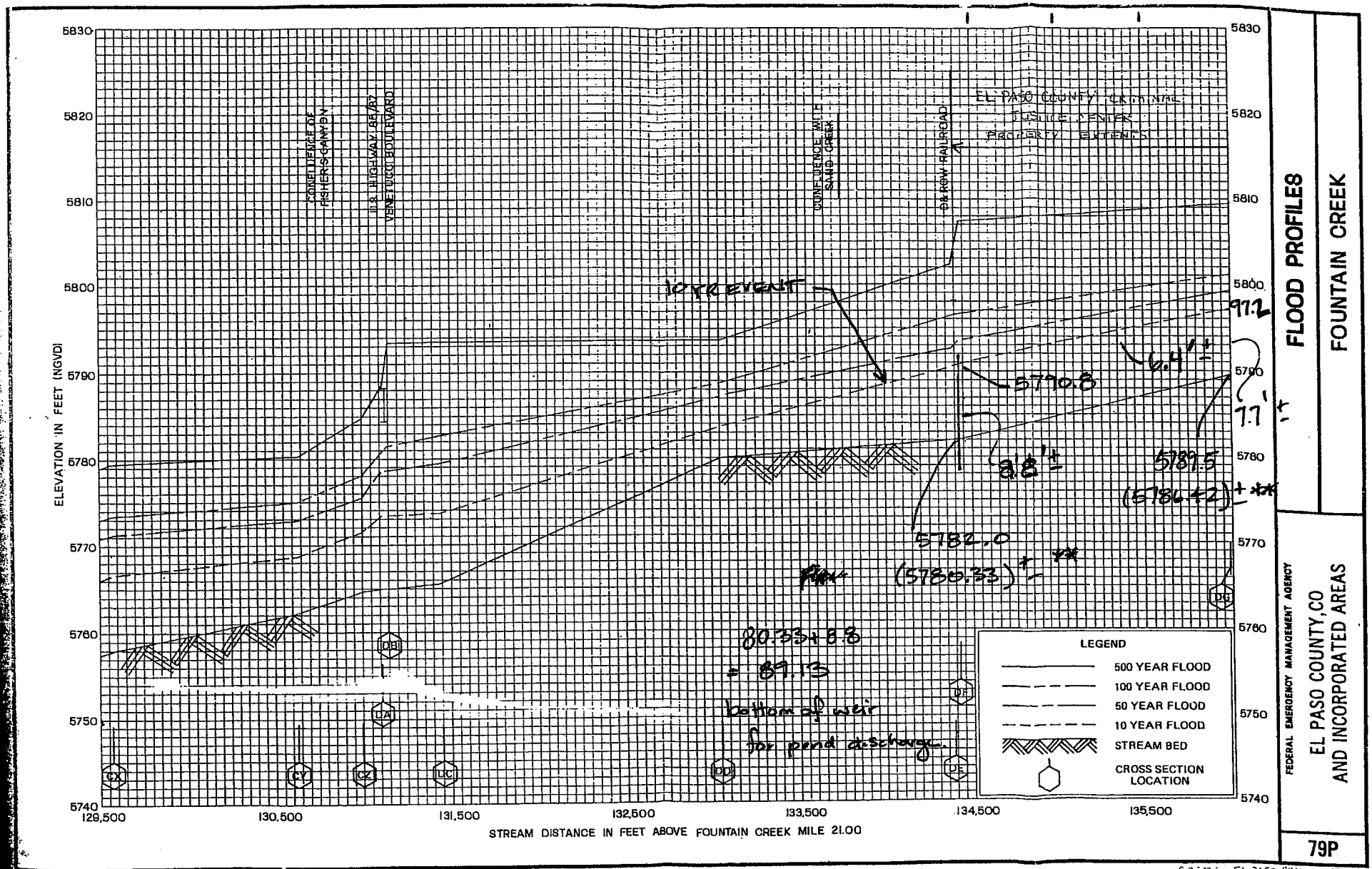
Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet Per Second) 10-Year	50-Year	100-Year	500-Year
Fisher's Canyon-Above Loomis Avenue	3.59	--[1]	--[1]	1,640	--[1]
At West Meadows Drive	2.36	--[1]	--[1]	440	--[1]
Upstream of Fisher's Canyon-South Branch					
Fisher's Canyon-South Branch	1.23	--[1]	--[1]	1,290	--[1]
At confluence with Fisher's Canyon					
Fountain Creek	772.0	21,300	64,000	93,000	215,000
At El Paso-Pueblo County Line	456.0	12,700	38,000	57,000	132,000
Downstream of confluence with Sand Creek	358.0	9,200	28,500	42,200	98,000
Downstream of confluence with Monument Creek	120.0	4,400	14,000	20,500	47,000
Upstream of confluence with Monument Creek	71.0	3,750	11,800	17,100	40,000
Upstream of City of Colorado Springs corporate limits	7.8	2,200	5,800	7,500	14,000
At El Paso-Teller County Line					
Franceville Tributary to Jimmy Camp Creek	4.1	1,700	2,800	3,500	4,300
At confluence with Jimmy Camp Creek					
Jimmy Camp Creek	66.4	8,500	12,400	16,000	20,500
At confluence with Fountain Creek					
Jimmy Camp East Tributary	9.2	2,800	4,600	5,500	6,900
At confluence with Jimmy Camp Creek					
Jimmy Camp West Tributary	3.93	1,160	2,280	2,780	4,500
At confluence with Jimmy Camp Creek					
Kettle Creek	16.3	2,600	6,600	9,300	19,300
At State Highway 83					

[1]Data not available

DF 134,420

1578'±

DF 135,998



FLOOD PROFILES

FOUNTAIN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

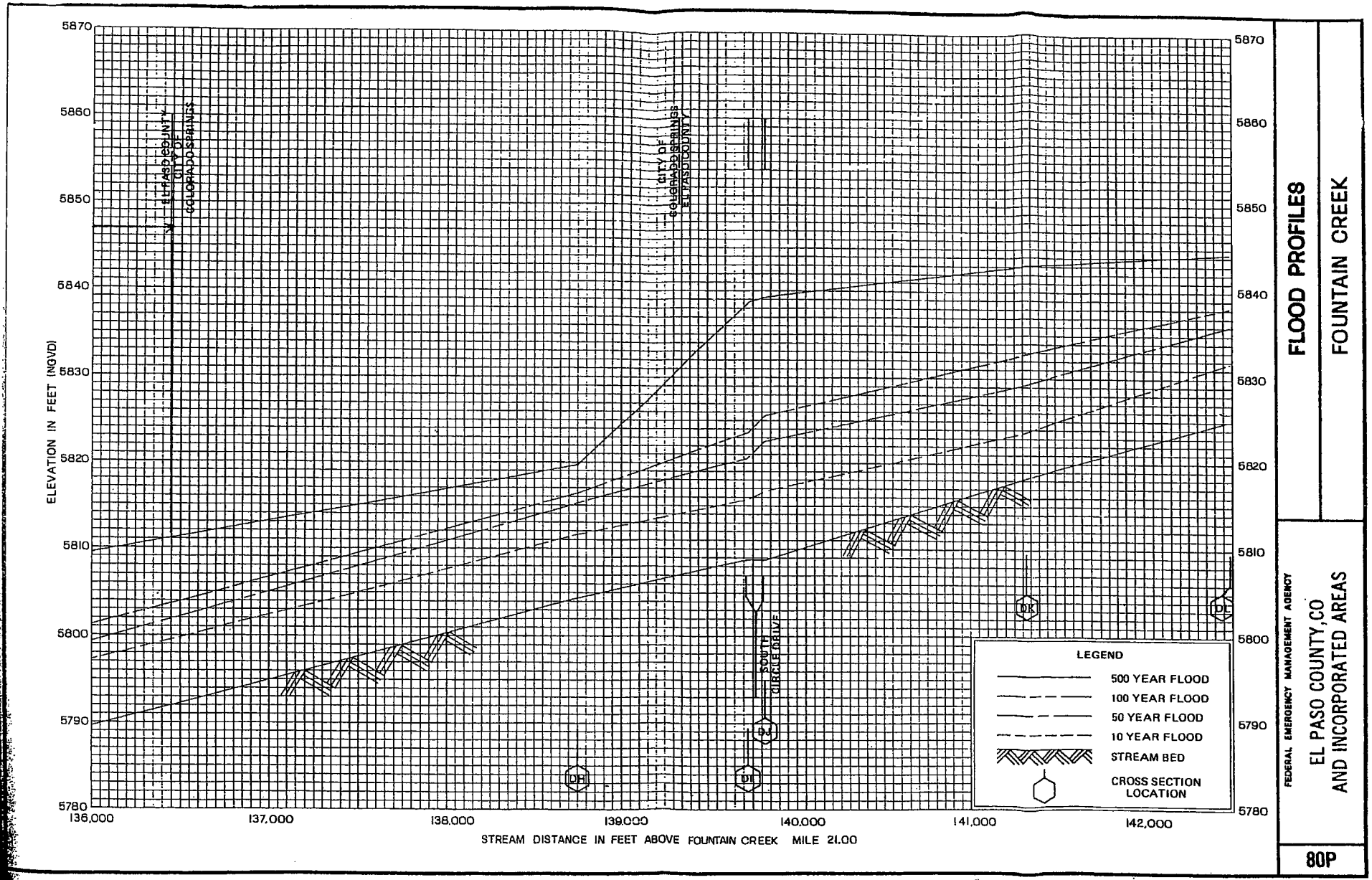
EL PASO COUNTY, CO
AND INCORPORATED AREAS

79P

CTCPG - EL PASO COUNTY CTC A-18

* INFORMATION ON PROFILE REGARDING 10YR FLOWS.

** ELEVATION INTERPOLATED FROM AERIAL TOPOGRAPHY.



FLOOD PROFILES

FOUNTAIN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

EL PASO COUNTY, CO
AND INCORPORATED AREAS

80P

CARTO-EL PASO COUNTY CTC

CLASSIC SM
CONSULTING
ENGINEERS & SURVEYORS

PRELIMINARY ENVIROMENTAL ASSEMENTMENT MEMO

Walsh
ENVIRONMENTAL SCIENTISTS AND ENGINEERS, LLC

Memo

To: Kyle Campbell, Classic Consulting

From: Janetta Shepard

CC:

Date: March 15, 2007

Re: Vineyard Golf Course Property – Assessment Summary Memo

On Friday, March 9, 2007, a reconnaissance was conducted of the Vineyards Golf Course property to determine current site conditions and identify the locations of ecological features for use in development planning. The assessment was completed by touring the course via golf cart with one of the managers and founders of the golf course (i.e., Mark). The assessment included verification of the location of previously constructed wetland mitigation areas, the locations of additional wetlands on the property, potential habitat for threatened and endangered species, and for migratory birds (including active or inactive nests).

Mitigation Areas – Based on my conversation with Van Truan of the USACE prior to the site visit, I was able to confirm the locations of the two onsite mitigation areas that were previously constructed to compensate for wetland losses associated with the World Arena and a fitness center. Mitigation for the World Arena was completed along the riparian corridor of the drainage that flows along the southern property boundary and consists primarily of cottonwood trees supplemented with willow shrubs. These plantings extend along the entire length of the ditch beginning at the confluence with Fountain Creek, although some of the vegetation in this area may be pre-existing, naturalized plant material. At any rate the mitigation is restricted to the banks of the ditch and does not extend into the adjacent floodplain.

The second mitigation area flanks the I-25 frontage road south of the winery and is comprised of the large pond and linear, low-lying area north of the pond. The trees are staked and the boundaries of the wetland plantings are fairly obvious. However, the pond has dried up completely and vegetation along the bottom may or may not be dead (difficult to tell this early in the season). Mark indicated the hydrology for the entire area has altered over the years and everything is drier and also mentioned it was being considered for future mitigation by Classic. In my opinion this mitigation area has not been successful. Nevertheless the area has been designated as mitigation for another project by the USACE and therefore would not be available for use as a mitigation area for proposed future impacts. With the reliability of the hydrology being in question, it may not be a viable choice anyway.

Wetland Habitat - Wetlands on the property appear to be minimal and generally occur in conjunction with the three man-made ponds. At the two ponds on the north side of the property, wetland plants do not extend beyond the fringes of the pond and consist primarily of cattails and bulrush. There are no trees or shrubs. The southern pond contains a low bench to the north and west that is vegetated with a mixture of wetland and upland herbaceous plants. Again, at this time of year it's difficult to say with certainty how extensive actual wetland habitat is in this area. There are a couple of other areas within the floodplain meadow that contain a mixture of wetland and upland plants and weeds. These areas appear to be dried out and in the process of transitioning to upland meadows. A sign posted to a tree

warns of staying out of the wetlands, but the meadow behind the sign was mostly devoid of wetland vegetation.

It should be noted that although surface wetland areas are nominal, groundwater appears to be high across the floodplain (i.e., a pool of surface water seeping up from groundwater was observed just east of the clubhouse). While this means the floodplain probably isn't an ideal location for constructing structures, it does provide an abundance of opportunities for the creation of wetlands.

T&E Species and Migratory Birds - Site conditions on the Vineyards Golf Property are not suitable to fulfill the life requisites of the T&E species listed for El Paso County with the exception of avian species. Specifically, there are no active or abandoned prairie dog colonies or other burrows, mud flats or large lakes, perennial sources of flowing water, or rocky outcrops and cliffs.

However, woody vegetation is well-developed and abundant, which provides a variety of habitat niches for birds. Most notably, there is a raptor nest in one of the mature cottonwood trees in the middle of the floodplain meadow. At this time of year (before the trees are leafed out) this nest is clearly visible from just about every part of the Vineyards property. The nest is currently unoccupied but according to Mark was occupied by two raptors (my guess is red-tailed hawks) last year. In addition, because of the mature cottonwood gallery flanking Fountain Creek, the approximate 15-20-foot high cottonwoods planted along the south ditch, and the groves of mature trees that meander across the floodplain meadow, it is likely that use and habitation by local avian species, raptors and migratory birds is high.

Because of the undeveloped nature of the property, it's highly likely that local wildlife (e.g., small to mid-sized mammals such as rabbits, rodents, fox, coyote, and deer) use the site for resting, hunting, forage and as travel corridors. Water fowl (i.e., mallard ducks and Canadian geese) were using the ponds at the time of the site visit and it's likely that at least some of these water birds are year round residents. In my brief reconnaissance of the property I did not observe indication of year-round habitation (i.e., burrows, bedding areas, etc.), but it is possible that some of these animals do live on the property.

Although Fountain Creek is off of the property, I will mention that the Arkansas Darter is a state-listed species of concern on major drainages in south Colorado Springs (and farther south), and also is a candidate species for Federal listing under the Endangered Species Act. Because the south ditch confluences with Fountain Creek, it's probably prudent to avoid any activities that might affect the ditch.

P:\Wetland-E&TSpecies\Classic Communities\Vineyards Golf\Vineyards Golf Summary Memo.doc

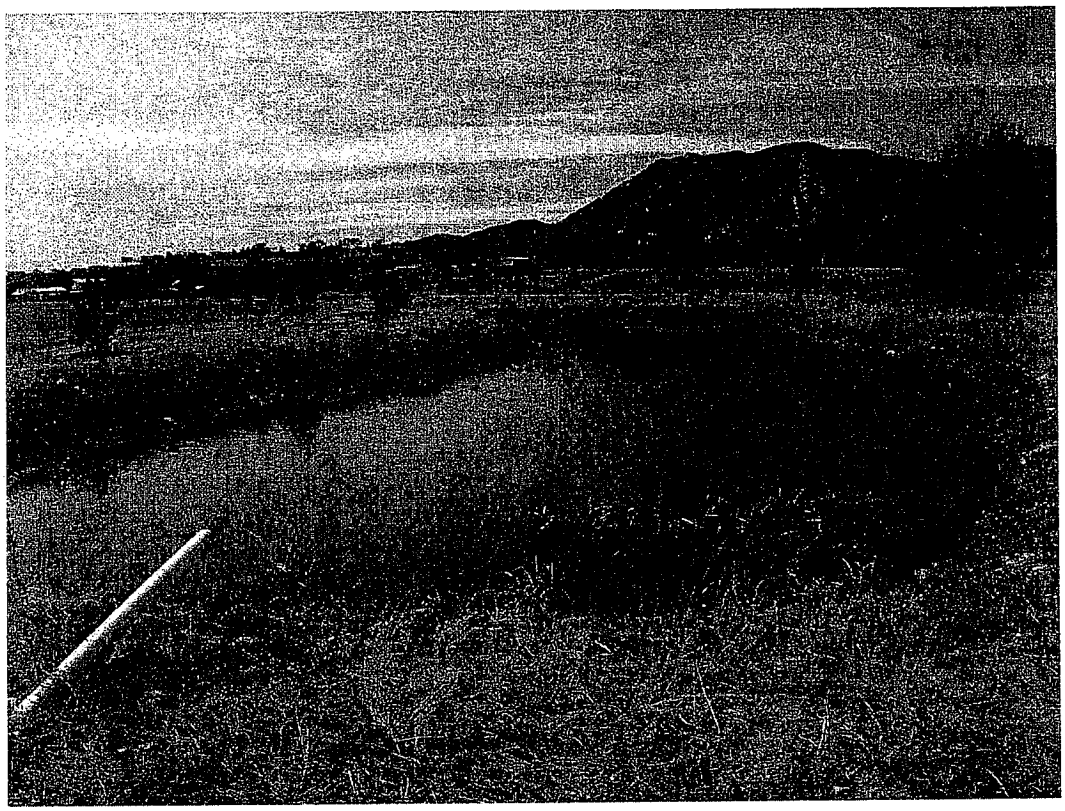


Photo 1 – Vew of north pond looking east

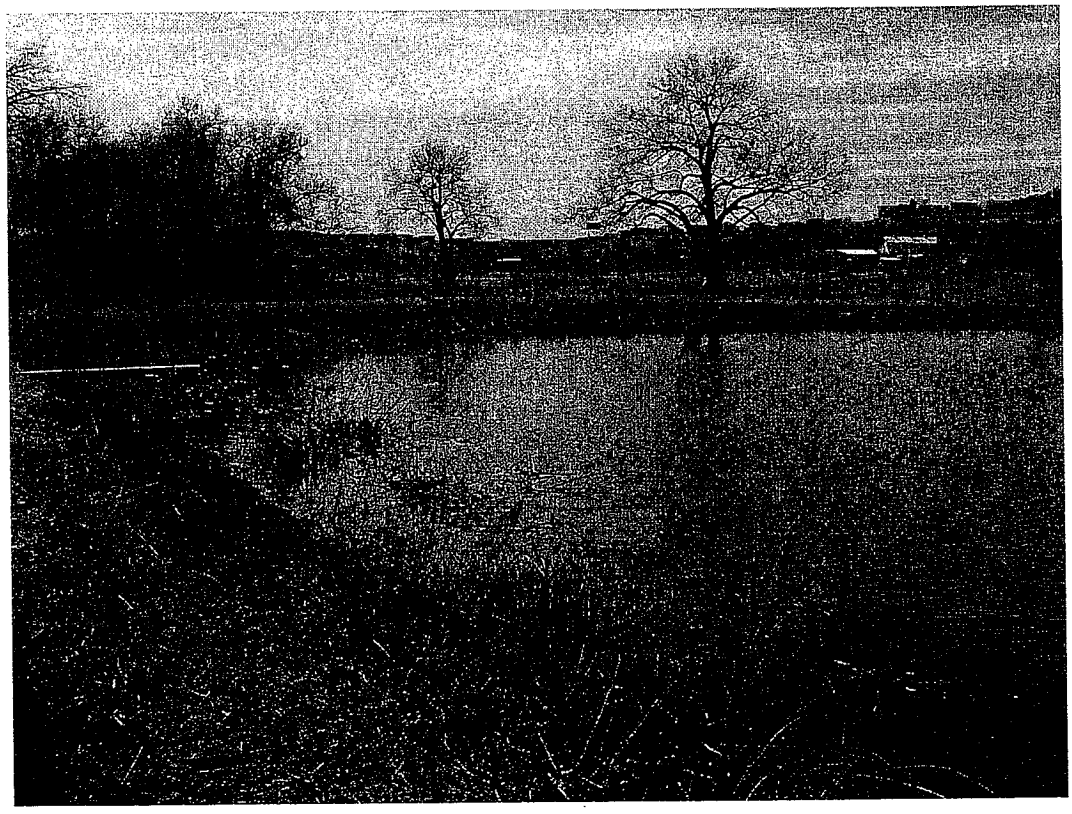


Photo 2 – Vew of pond south of north pond

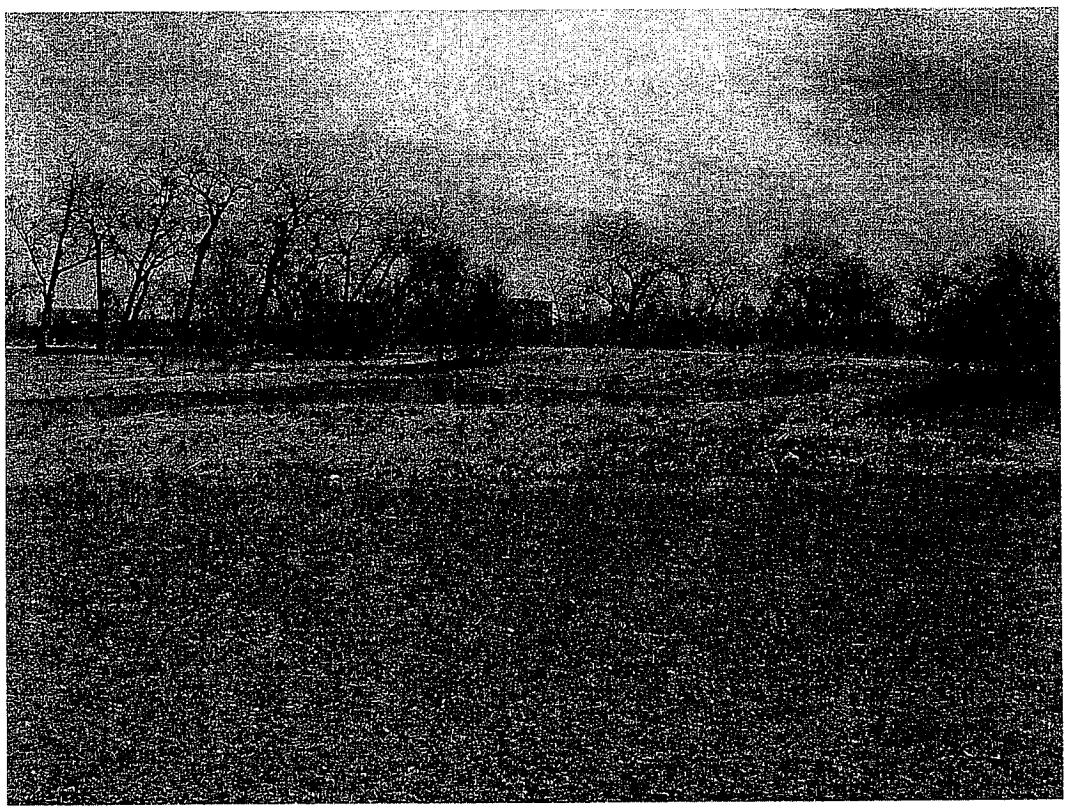


Photo 3 – View of south pond w/wetland fringe/bench

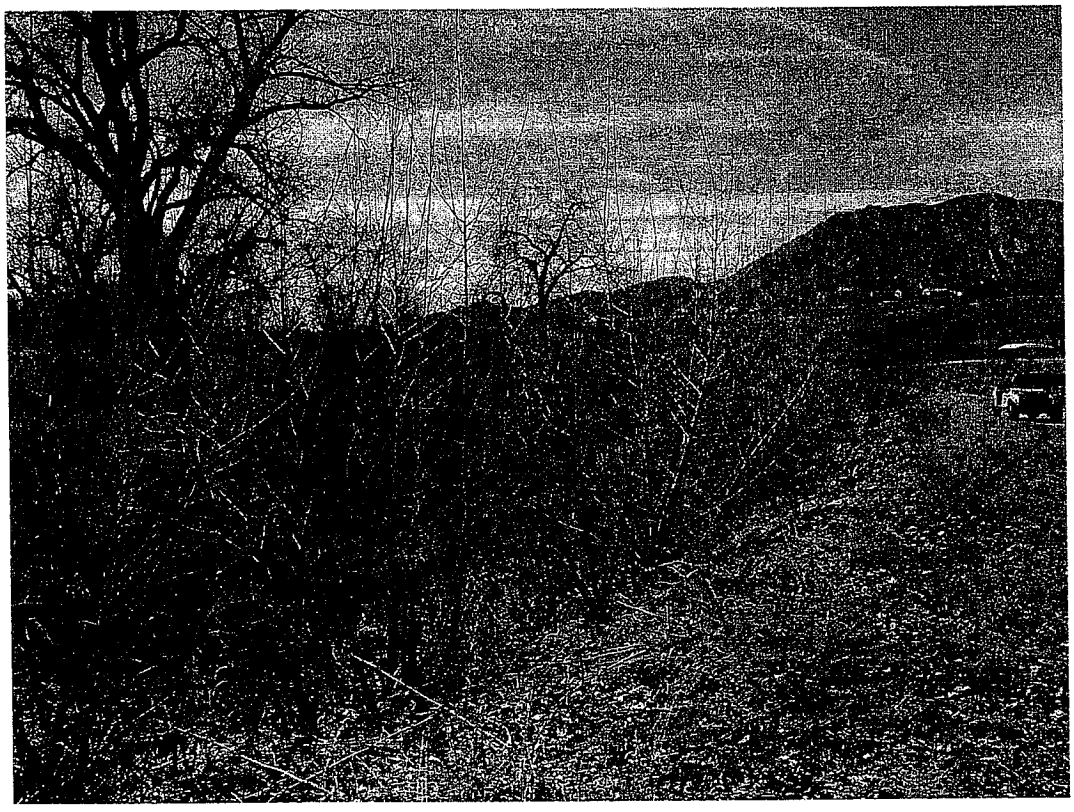


Photo 4 – South drainage mitigation along riparian corridor

Photo 5 – South drainage mitigation area farther west

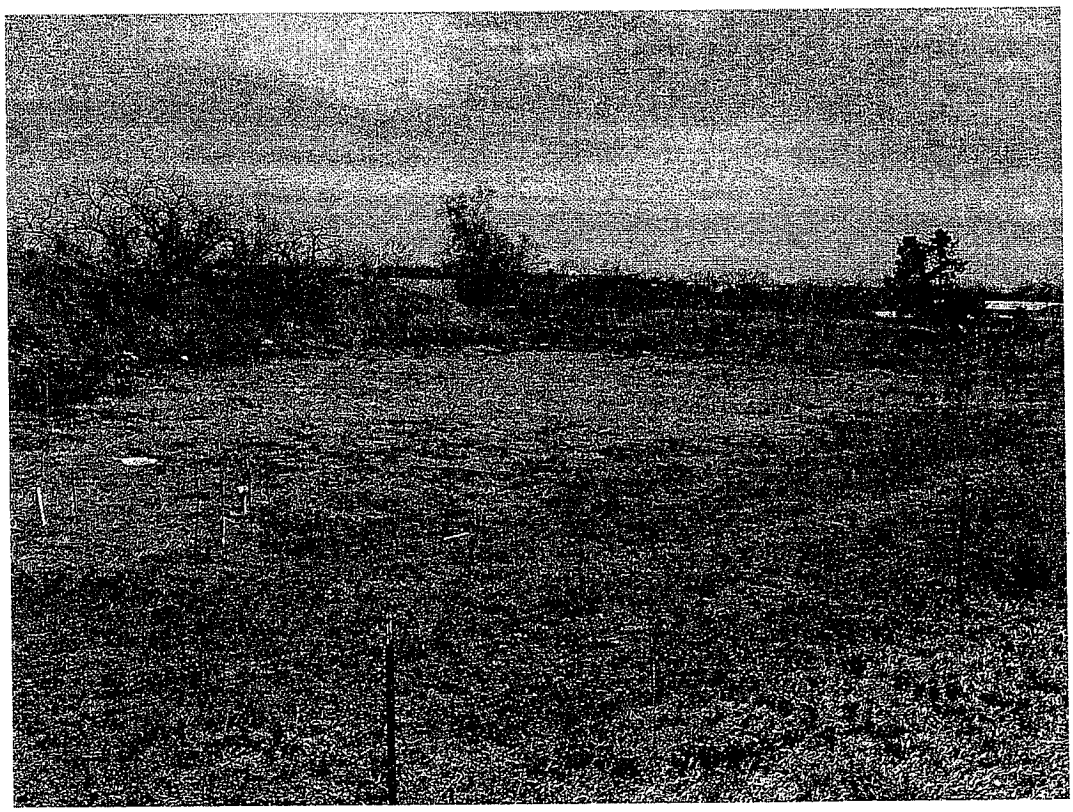


Photo 6 – View of mitigation pond at I-25 frontage road

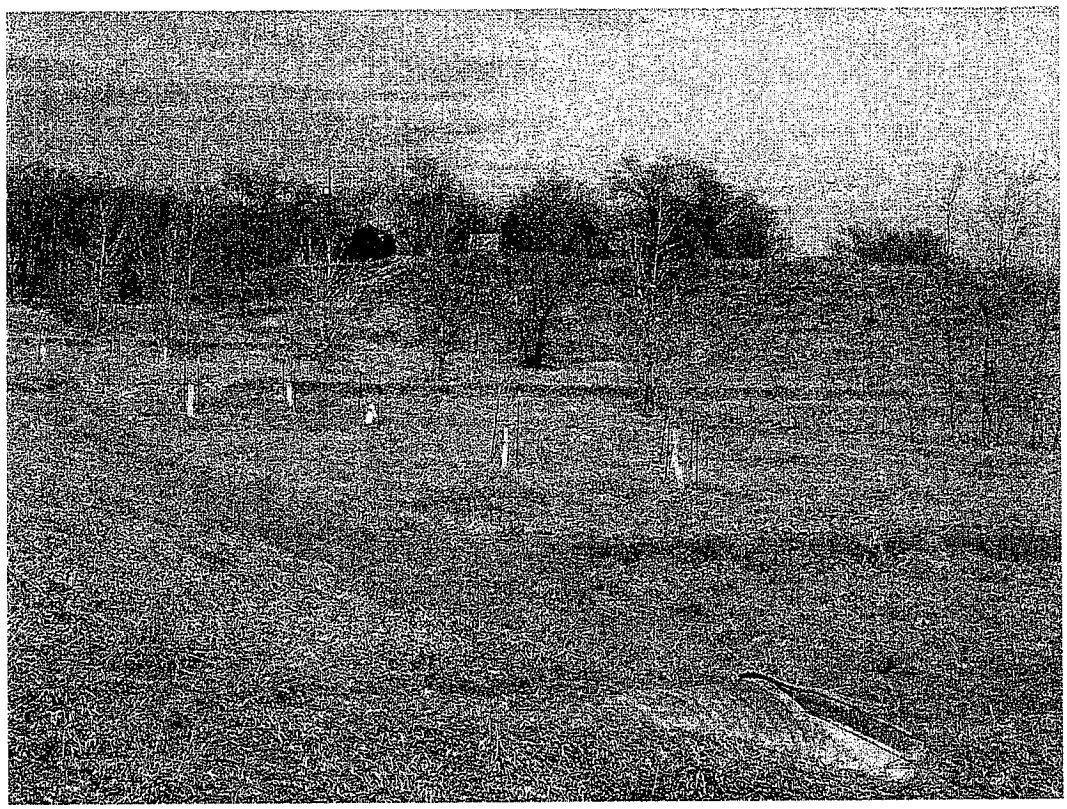


Photo 7 – Staked trees on north side of mitigation pond

Photo 8 – Well-developed cottonwood grove in floodplain meadow

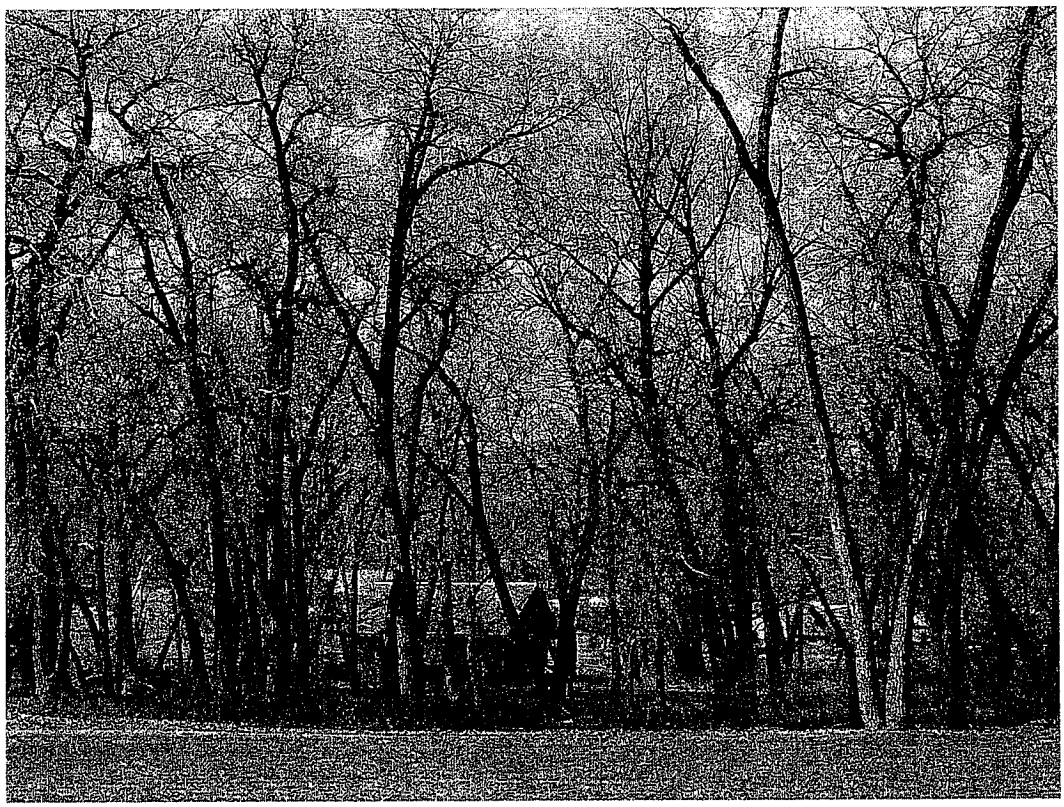


Photo 9 – Owners cabin on floodplain in cottonwood stand

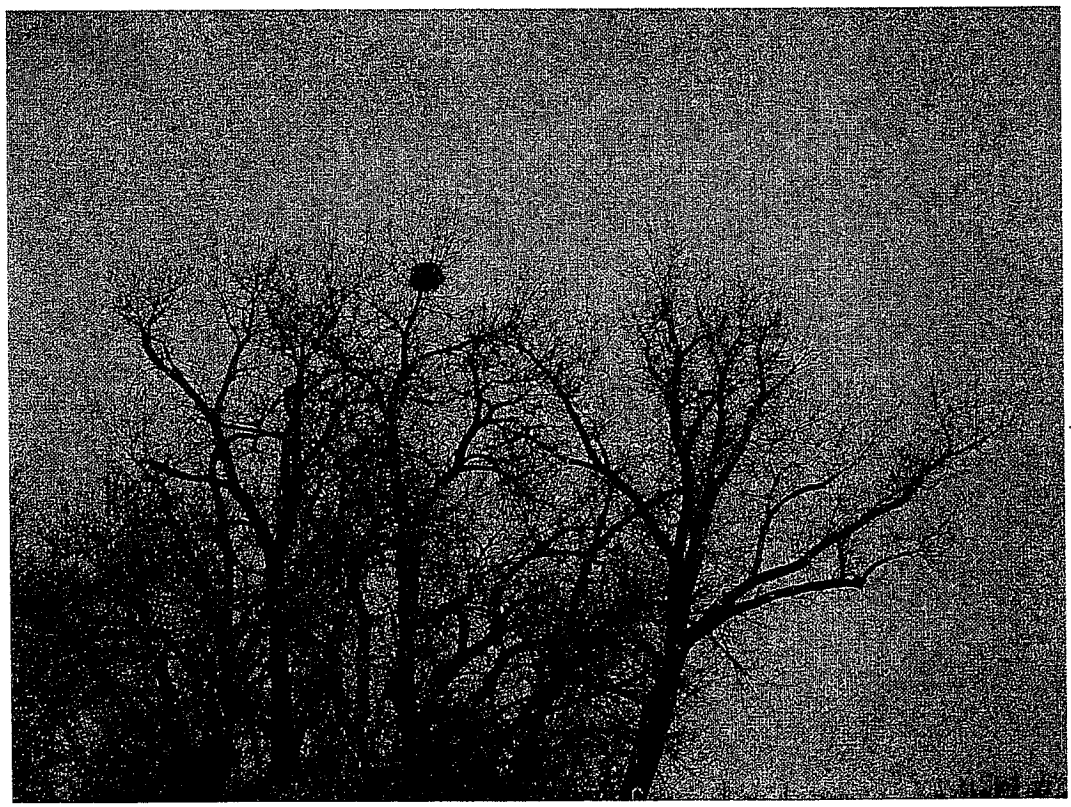
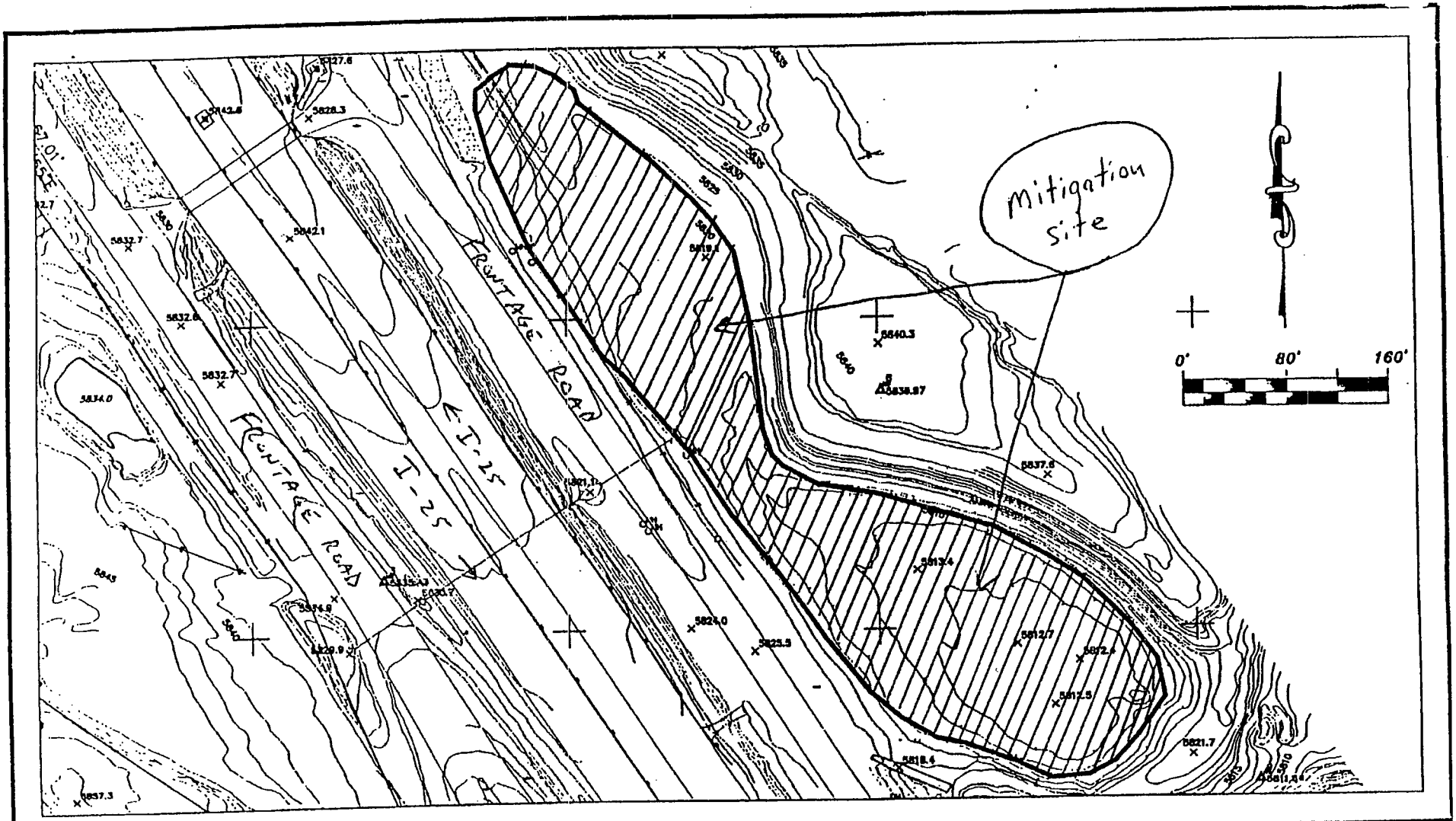


Photo 10 – Currently unoccupied raptor nest



National Strength and Conditioning Association
Building Construction in Wetlands
Colorado Springs, El Paso County, Colorado

Mitigation Site Detail

Action No. 2002 00571 Sheet 3 of 4

PREVIOUSLY MITIGATED AREA FOR NSCA

Walsh
Environmental Scientists and Engineers, LLC

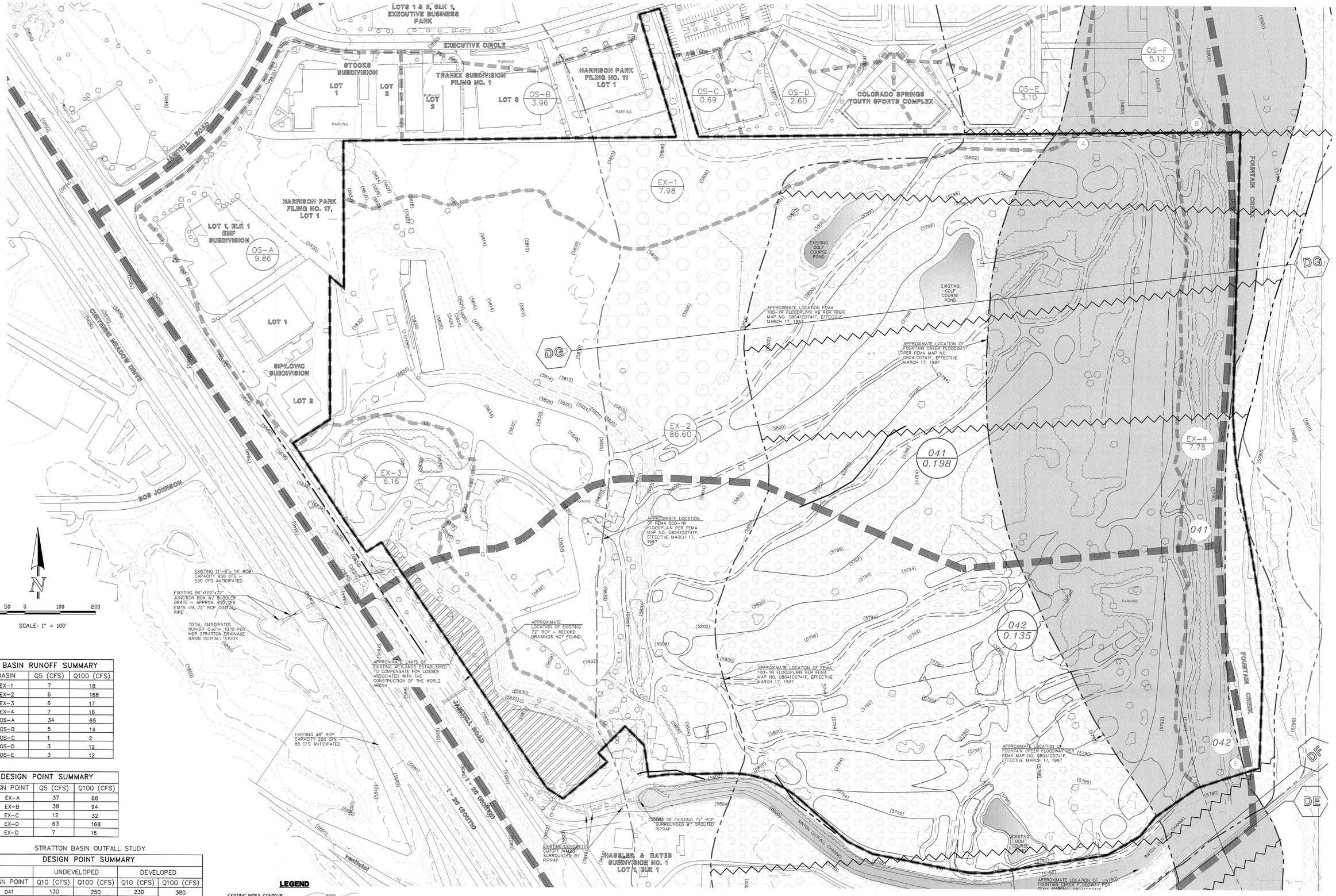
Proposed Wetland Mitigation Area
NSCA Site
Colorado Springs, Colorado

Job: 4998-010	Date: 8/02	Figure: 2

CLASSIC
CONSULTING
ENGINEERS & SURVEYORS

DRAINAGE MAP

MASTER DEVELOPEMENT DRAINAGE PLAN
VINEYARD COMMERCE PARK
AUGUST 2008



BASIN RUNOFF SUMMARY		
BASIN	Q5 (CFS)	Q100 (CFS)
EX-1	7	18
EX-2	6	168
EX-3	6	17
EX-4	7	16
OS-A	34	65
OS-B	5	14
OS-C	1	2
OS-D	3	12
OS-E	3	12

DESIGN POINT SUMMARY		
DESIGN POINT	Q5 (CFS)	Q100 (CFS)
EX-A	37	88
EX-B	38	94
EX-C	12	32
EX-D	63	168
EX-D	7	16

STRATTON BASIN OUTFALL STUDY

DESIGN POINT SUMMARY				
	UNDEVELOPED		DEVELOPED	
DESIGN POINT	Q10 (CFS)	Q100 (CFS)	Q10 (CFS)	Q100 (CFS)
041	130	250	230	380
042	110	200	230	350

LEGEND

EXISTING INDEX CONTOUR 5910
EXISTING NOMINAL CONTOUR 5910
SUBDIVISION BOUNDARY
LOT LINE
BASIN IDENTIFIER D
AREA IN ACRES 1.41
MASTER DRAINAGE PLAN BASIN BOUNDARY PER STRATTON DRAINAGE BASIN OUTFALL STUDY
DIRECTION OF DRAINAGE
EXISTING STORM SEWER
EXISTING STORM INLET
EXISTING WETLANDS AREA
EXISTING WETLANDS AREA AS TAKEN FROM STRATTON DRAINAGE BASIN OUTFALL STUDY
BASIN IDENTIFIER D
AREA IN ACRES 1.41
FEMA 500-YR FLOODPLAIN BOUNDARY LINE
FEMA 100-YR FLOODPLAIN BOUNDARY LINE
FEMA FLOODWAY BOUNDARY LINE
500-YR FLOODPLAIN ZONE PER FEMA MAP NO. 08041C0741F, 08041C0742F
100-YR FLOODPLAIN ZONE PER FEMA MAP NO. 08041C0741F, 08041C0742F
FLOODWAY PER FEMA MAP NO. 08041C0741F, 08041C0742F
HISTORIC BASIN BOUNDARY

VINEYARD COMMERCE PARK
M.D.D.P. MAP (EXISTING)
JOB NO. 2204.00
08/18/08
SHEET 1 OF 1

CLASSIC CONSULTING ENGINEERS & SURVEYORS
6385 Corporate Drive, Suite 101
Colorado Springs, Colorado 80919
(719)785-0790
(719)785-0799 (Fax)

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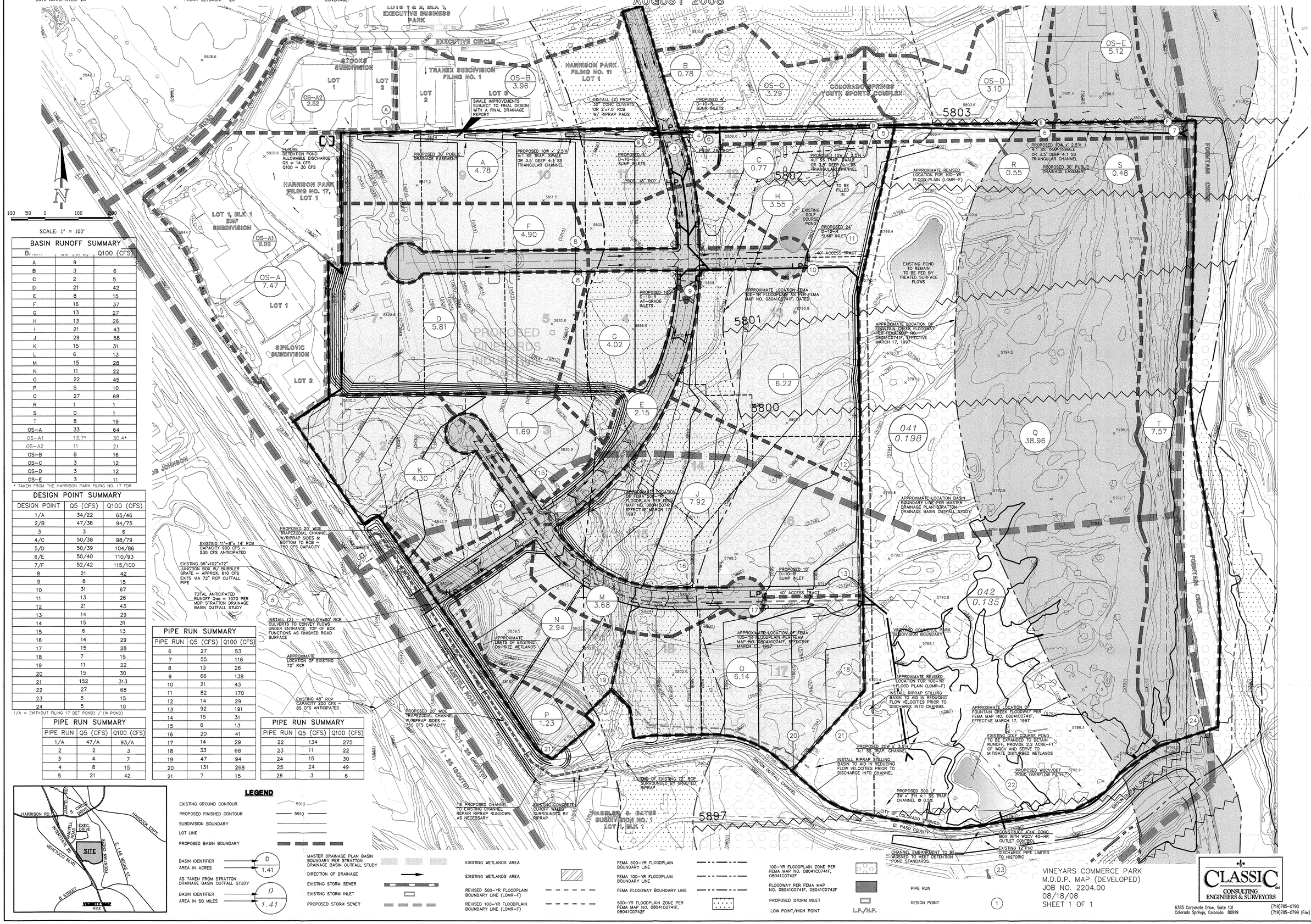
SITE NOTES:

SITE AREA:	108.5 ACRES	ZONING:	PIP-2 (INDUSTRIAL-COMMERCIAL)	AVG. LOT SIZE:	2.8 ACRES
LOT AREA:	55.5 ACRES	R/W WIDTH:	65'	SIDE SETBACK:	10'
R/W AREA:	7.3 ACRES (INCLUDES 40' TRACT AREAS)	ROAD WIDTH:	44'	REAR SETBACK:	25'
FLOODWAY AREA:	47.6 ACRES	MAXIMUM HEIGHT:	45'	MAXIMUM LOT COVERAGE:	40%
LOTS ANTICIPATED:	20	FRONT SETBACK:	25'		

MASTER DEVELOPEMENT DRAINAGE PLAN
VINEYARDS COMMERCE PARK
AUGUST 2008



BASIN RUNOFF SUMMARY

BASIN	AC (Q5)	Q100 (CFS)
A	9	
B	3	6
C	2	5
D	21	42
E	8	15
F	16	37
G	13	27
H	13	26
I	21	43
J	29	58
K	15	31
L	6	13
M	15	28
N	11	22
O	22	45
P	5	10
Q	27	68
R	1	1
S	0	1
T	8	19
OS-A	33	64
OS-A1	13.7*	30.4*
OS-A2	11	21
OS-B	8	16
OS-C	3	12
OS-D	3	12
OS-E	3	11

* TAKEN FROM THE HARRISON PARK FILING NO. 17 FDR

DESIGN POINT SUMMARY

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
1/A	34/22	65/46
2/B	47/36	94/75
3	3	6
4/C	50/38	98/79
5/D	50/39	104/86
6/E	50/40	110/93
7/F	52/42	115/100
8	21	42
9	8	15
10	31	67
11	13	26
12	21	43
13	14	29
14	15	31
15	6	13
16	14	29
17	15	28
18	7	15
19	11	22
20	15	30
21	152	313
22	27	68
23	6	15
24	5	10

1/A = (WITHOUT FILING 17 DET POND) / (W POND)

PIPE RUN SUMMARY

PIPE RUN	Q5 (CFS)	Q100 (CFS)
1/A	47/A	93/A
2	2	3
3	4	7
4	8	15
5	21	42

PIPE RUN SUMMARY

PIPE RUN	Q5 (CFS)	Q100 (CFS)
6	27	53
7	55	116
8	13	26
9	66	138
10	21	43
11	82	170
12	14	29
13	92	191
14	15	31
15	6	13
16	20	41
17	14	29
18	33	68
19	47	94
20	131	268
21	7	15

PIPE RUN SUMMARY

PIPE RUN	Q5 (CFS)	Q100 (CFS)
22	134	275
23	11	22
24	15	30
25	24	49
26	3	6

LEGEND

EXISTING GROUND CONTOUR 5910
PROPOSED FINISHED CONTOUR 5910
SUBDIVISION BOUNDARY
LOT LINE
PROPOSED BASIN BOUNDARY
BASIN IDENTIFIER D
AREA IN ACRES 1.41
AS TAKEN FROM STRATTON DRAINAGE BASIN OUTFALL STUDY
BASIN IDENTIFIER D
AREA IN SQ MILES 1.41
MASTER DRAINAGE PLAN BASIN BOUNDARY PER STRATTON DRAINAGE BASIN OUTFALL STUDY
DIRECTION OF DRAINAGE
EXISTING STORM SEWER
EXISTING STORM INLET
PROPOSED STORM SEWER
EXISTING WETLANDS AREA
EXISTING WETLANDS AREA
REVISED 500-YR FLOODPLAIN BOUNDARY LINE (LOMR-F)
REVISED 100-YR FLOODPLAIN BOUNDARY LINE (LOMR-F)
FEMA 500-YR FLOODPLAIN BOUNDARY LINE
FEMA 100-YR FLOODPLAIN BOUNDARY LINE
FEMA FLOODWAY BOUNDARY LINE
500-YR FLOODPLAIN ZONE PER FEMA MAP NO. 08041C0741F, 08041C0742F
100-YR FLOODPLAIN ZONE PER FEMA MAP NO. 08041C0741F, 08041C0742F
FLOODWAY PER FEMA MAP NO. 08041C0741F, 08041C0742F
PROPOSED STORM INLET
LOW POINT/HIGH POINT L.P./H.P.
PIPE RUN
DESIGN POINT 1

VINEYARS COMMERCE PARK
M.D.D.P. MAP (DEVELOPED)
JOB NO. 2204.00
08/18/08
SHEET 1 OF 1

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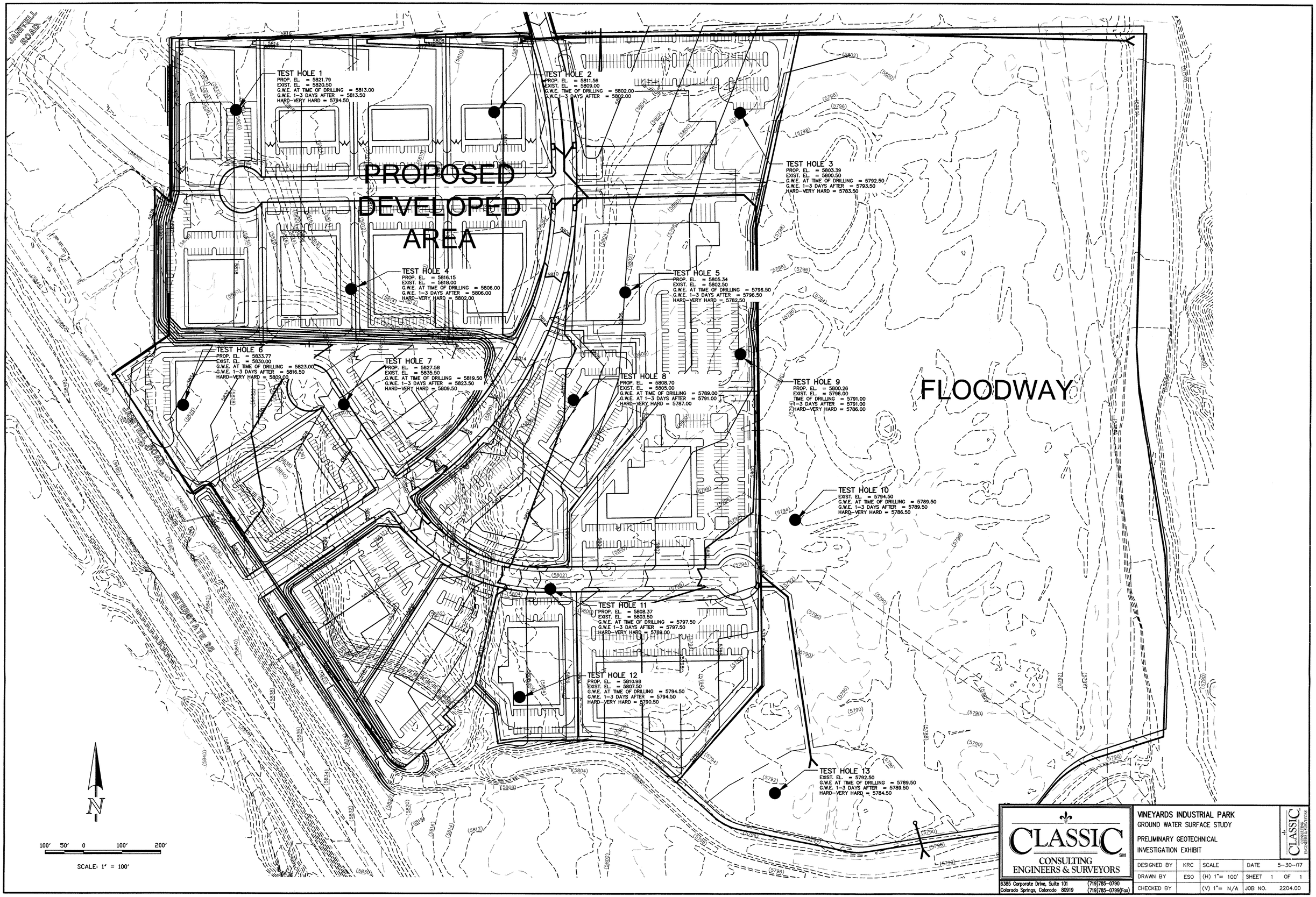

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Colorado Springs, Colorado 80919 (719)785-0799(Fax)

VINEYARDS INDUSTRIAL PARK
GROUND WATER SURFACE STUDY
PRELIMINARY GEOTECHNICAL INVESTIGATION EXHIBIT

CLASSIC CONSULTING ENGINEERS & SURVEYORS

DESIGNED BY	KRC	SCALE		DATE	5-30-07
DRAWN BY	ESO	(H) 1"= 100'	SHEET	1	OF 1
CHECKED BY		(V) 1"= N/A	JOB NO.	2204.00	

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PRELIMINARY
GROUND WATER
STUDY