Del Norte Dialysis
Final
Drainage Report

5207 San Mateo Blvd.
Albuquerque, NM 87109

May 5, 2015

Prepared By:

EES
Entitlement and Engineering Solutions, Inc.
518 17th Street, Suite 1575
Denver, CO 80202
Phone: (303) 572-7997
Attn: Amanda M. O'Connor, P.E.

Engineer's Statement

This report for the conceptual design of the Del Norte Dialysis Center was prepared by me or under my direct supervision in accordance with the provisions of City of Albuquerque, Bernalillo County, New Mexico Design Process Manual Section 22. I understand that the City of Albuquerque, New Mexico does not and will not assume liability for drainage facilities designed by others.

Amanda M. O'Connor
Registered Professional Engineer

State of New Mexico No. 19951

(Affix Seal)

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Executive Summary

Project Location and Zoning

The Del Norte Dialysis Center project site is located on the west side of San Mateo Boulevard approximately 430 feet north of Mcleod Road in the Tract B-1 (formerly Tract B) of the Sandia Addition in the City of Albuquerque, Bernalillo County. This site falls within a designated Enhanced Transit Corridor of an Established Urban Area of the Comprehensive Plan. It is located within the boundaries of the City Zone Map F-17 as shown on the Drainage Map within Appendix C. The site lies within the Flood Zone X and therefore is not designated as a flood prone area in accordance with the National Flood Insurance Program Rate Map No. 35001C0139 G, effective date 9-26-2008. The current zoning for the site is C3, heavy commercial and the proposed use is permissive within this zone category.

Existing Site and Drainage Concept

The site was previously used as a garden nursery but has since been cleared of all structures and overlot graded to follow the historic drainage patterns with topography that falls to the southwest. The site maintains minimal vegetation due to this grading disturbance and demolition.

In 2011, the Golden Corral was designed and constructed in the Tract A of the Sandia Addition, due north of this project. The proposed grading for this site generally drains southwesterly with the northern perimeter of the site draining to the north. This site utilizes curb cuts, cobbled swale rundowns and concrete flumes to connect their site drainage with the existing channel along the north property line of Tract A and then across Tract C-1 (formerly Tract C) to the existing channel along the west Tract-C-1 perimeter. The building roof drains and a portion of this site's west perimeter connect subsurface to the existing storm system within San Mateo Boulevard.

In 2013 two ponds were designed and constructed on west side of Tract C-1 to the north and south (see Appendix A for the Temporary Detention Plan by Isaacson & Arfman, PA, dated 8-27-13). Tract C-1 is located west of this project. These ponds were designed and constructed in response to a failure of the berm along the west side of the existing channel along the Tract C-1 perimeter. The berm was eroding after a series of large rain storms and allowing drainage to flood the adjacent property to the west of Tract C-1. Both detention ponds were designed to detain the 100-year, 6-hour storm for the Sandia Addition Tracts A, B-1 (formerly Tract B) and C-1 in the full developed condition. The contributing basin for each pond is designed with an estimated land treatment D (impervious area) of 80% for the overall basin area. Both ponds outlet flows to the existing west perimeter channel with a controlled release rate. In addition, the existing channels along the north and west perimeters were repaired with shotcrete as part of the overall design of these detention ponds.

Project Description and Drainage Concept

The proposed Del Norte Dialysis Center is an outpatient medical facility with a single story 8,535 sf building. The site layout will incorporate 30 stalls of onsite parking with landscape medians framing each parking aisle and with landscape buffers aligning the perimeters of the site. The proposed site will drain storm flows away from the building toward the curb and gutter aligning the perimeter of the parking area and drives. The storm flow will channelize within the curb and gutter and convey it to the west along the south drive aisle, north along the west row of parking stalls, and west along the north parking area perimeter and then outlet the parking area drainage through two proposed concrete drainage chases located to the northwest corner of the parking area.

These chases will direct Tract B-1 parking area drainage to the existing 28' wide drive aisle to the north of the project site and running east-west along the southern boundary of the Golden Corral parking area. The drive aisle will drain surface flows to the west and outlet at the existing curb cut located to the west end of this drive aisle. A proposed rock lined trapezoidal channel will convey drainage flow from the curb cut to the north pond. The north pond footprint will be extended south to accommodate the additional drainage contributed by Tract B-1 and the south drive aisle. In addition, the rock lined channel originally conveying drainage westerly from this curb and discharging to the existing channel along the west Tract C-1 boundary will be removed. The Golden Corral parking area drainage contributing surface flow to this south drive aisle will remain unchanged.

Required Project Approvals

The development process for this project will require the following approvals listed below. Some approvals are already in process:

- Grading and Drainage Plan
- West lot line adjustment for Tract B and C for the Sandia Addition Plat was approved by the DRB on March 11, 2015 with the project number 1007867. This also included a defined utility easement through Tract B for the benefit of Tract C. With this plat adjustment, Both Tracts B and C were renamed to Tracts C-1 and B-1 to signify the lot line change.
- SDP for Subdivision Minor Amendment reflecting Sandia Addition Plat adjustments listed above was approved on the same date and project number.
- SDP for Building Permit through DRB
- Building Permit
- Retaining Wall Permit

Existing Conditions

Drainage pattern and facilities

The site is currently undeveloped and located in the precipitation zone 2 as outline in the DPM Chapter 22.2. The existing land treatment for Tract B-1 is mostly C where undeveloped. The eastern portion of Tract B-1 is currently built out with an approximate 28' wide shared access

drive for Tracts A, B and C and a finished 20' wide landscape buffer dividing this access drive from the San Mateo Boulevard ROW as was developed with the design and construction of the Golden Corral. The south adjacent property Tract A-1A of the Sanbusco Addition is developed as an industrial use and is elevated above the south Tract B-1 perimeter grades with the use of a small 1-3 foot retaining wall that aligns the south property line (see proposed drainage map). The grading for the Tract B-1 falls to the southwest, allowing for developed flows to drain along the north side of this retaining wall. This retaining wall appears to keep developed flow originating from Tract B-1 to remain within Tract B-1 as well as a portion of Tract C-1 as it drains westerly to the south detention pond. There appears to be no offsite drainage entering this site.

The existing North Pond located to the northwest of Tract C-1 was designed and constructed as a solution to eliminate drainage generated from the Golden Corral site from overtopping the existing west perimeter channel along Tract C-1. The North Pond basin area used to calculate the required pond volume is a simple rectangular basin that incorporates most of the Golden Corral area but does not include the drive aisle aligning the south parking area. The North Pond basin is a conservative depiction of the drainage area tributary to this pond for detention volume calculations but does not reflect the true drainage pattern in the existing condition. This analysis was prepared by Isaacson & Arfman and approved by the City in 2013 (see Appendix A for the Temporary Detention Plan by Isaacson & Arfman, PA, dated 8-27-13).

The true drainage pattern for area draining to the North Pond includes only the large parking area located to the west of the Golden Corral building as tributary area. This west parking area drains surface flow to the pond by way of a curb cut located in the west perimeter curb near the northwest corner of the parking lot (See Curb Opening No. 8 on Golden Corral Restaurant Drainage Plan provided in Appendix A). Drainage outlets to the north pond through the curb cut and is conveyed west down to the pond by a rock lined channel.

The Golden Corral parking area south of the building drains flows southwesterly to the drive aisle running along the south perimeter of the site. The south drive aisle continues to drain surface flow westerly to an existing curb cut located at the west boundary of the drive aisle. The curb cut outlets drainage to a rock lined channel that conveys flows west before discharging to the Tract C-1 west perimeter channel. The shared access drive within Tract B-1 that connects the Golden Corral site to San Mateo Boulevard NE also drains to this south drive aisle and contributes flow directly to the existing west channel by the drainage pattern outline above. As mentioned previously, the Golden Corral parking area was included in the North Pond basin for detention pond calculations but is not actually tributary to the pond in the existing condition.

Proposed Conditions

Drainage Concept

The proposed Del Norte Dialysis site improvements will incorporate a grading and drainage design to include redirecting the Tract B-1 site to drain to the northwest. Retaining walls are proposed along the south and west perimeters of the site to catch grade as necessary to accommodate the proposed grading design. The proposed basin drainage concepts are outline below:

Basin A-1: This basin incorporates the parking area and the drive aisle on the north side of the building. It also includes the adjacent building walks, garden and landscape areas along the north building perimeter. The general drainage pattern within this basin drains storm water away from the building, across the drive aisles to the curb and gutter aligning the north perimeter parking area where flows then become channelized. The curb and gutter along the north drains west to a curb chase located to the northwest of the parking area and denoted on the drainage area map as curb chase #1. The developed peak flows generated in this basin contribute 0.46 and 0.70 cfs for the 10 and 100 year storms. The curb chase #1 outlets this basin flow to the existing Golden Corral south drive aisle (Basin GC1) at design point 2 .

Basin A-2: This basin incorporates the parking area and the drive aisle on the south and west side of the building. It also includes the adjacent building walks and landscape areas along the south and west building perimeter. The general drainage pattern within this basin drains storm water away from the building, across the drive aisles to the curb and gutter aligning the south and west perimeter parking area where flows then become channelized. The curb and gutter along the drains west and then north to a curb chase located to the northwest of the parking area and denoted on the drainage area map as curb chase #2. The developed peak flows generated in this basin contribute 1.12 and 1.69 cfs for the 10 and 100 year storms. The curb chase #2 outlets this basin flow to the existing Golden Corral south drive aisle (Basin GC1) at design point 3.

Basin B: This basin incorporates the building roof drains which are proposed to be conveyed to curb chases and outlet to the drive aisle along the south side of the building at design point 1. Basin B drainage then follows the drainage pattern outlined in Basin A-2 and eventually outlets flow to the curb chase #2 at design point 3.

Basin R: This basin incorporates the developed eastern portion of Tract B-1 that includes the shared access drive, the 20’ wide finished landscape buffer east of this shared access, some landscape area along the east side of the Del Norte building and a narrow strip of landscape area aligning the Tract B-1 north perimeter. The existing infrastructure within this basin generally drains storm water northwesterly. The developed flows within the access drive and the eastern landscape median are channeled into the curb and gutter located on the west side of the access drive. Flows continue north in this gutter before it rounds the curb and continues west along the Golden Corral south drive aisle (Basin GC1). At the proposed DaVita site access

points, a 5'valley gutter is proposed to replace the existing curb and gutter to maintain the existing drainage patterns of this access drive described above. This basin generates peak flows of 0.52 and 0.82 cfs for the 10 and 100 storm, respectively.

Basin OS1: This basin contains the landscape strip aligning the south perimeter of Tract B-1 and will continue to drain in a southwesterly direction. The existing retaining wall along the south perimeter will remain intact as is. The minimal flows developed within this basin will continue to drain westerly along the north side of this retaining wall per the existing condition but with greatly reduced flows since the majority of the Tract B-1 drainage is now contained within the Basins A1 and A2. The peak flows generated in Basin OS1 are 0.14 and 0.26 cfs for the 10 and 100 year storm, respectively.

Basin OS2: This basin incorporates the narrow landscape strip aligning the west property line of Tract B-1 and drains westerly into Tract C-1 as done in the existing condition. This basin generates peak flows of 0.06 and 0.10 cfs for the 10 and 100 year storm, respectively.

Basin GC1: This basin contains the existing Golden Corral south drive aisle being used to convey Tract B-1 drainage to the North Pond. This 28' wide asphalt drive drains westerly with a cross slope pushing surface drainage to the south curb and gutter. As this drive extends west the cross slope transitions northwesterly pushing drainage to the north curb and gutter to the existing 8' wide curb cut at the west boundary of this drive aisle (see Curb Opening No. 8 on Golden Corral Restaurant Drainage Plan provided in Appendix A). The existing rock lined channel taking flows from the curb cut to the existing channel along the Tract C-1 west perimeter (bypassing the existing pond) will be eliminated. A new riprap rundown and pad will be constructed to direct flows from the curb cut to the expanded North Pond. This basin generated peak flows of 1.00 and 1.51 cfs for the 10 and 100 year storm, respectively. Design Point 5 designates the cumulative flow entering Basin GC1 that will outlet at the existing curb cut. The access drive is considered a 'common area' for the Sandia Addition Tracts and therefore can serve as a shared drainage way (see highlighted text within Sandia Addition Title Commitment Declaration of Easements, Covenants, and Restrictions included in the appendices of this report).

Basin GC2: This basin contains the existing Golden Corral south parking area. Drainage for this basin surface flows in a southwesterly direction and enters the Golden Corral south drive aisle (Basin GC1, design point 4). This basin will remain unchanged with the proposed Tract B-1 improvements. As discussed in the existing condition section of this report, this area is also already included in the original North Pond basin detention pond required volume (see Appendix A for the Temporary Detention Plan and calculations by Isaacson & Arfman, PA, dated 8-27-13). This basin has been delineated for this report to include its calculated peak runoff and analyze the cumulative impact of this basin and the Tract B-1 added drainage to the south drive aisle surface flows as displayed at design points 4 and 5. The Flowmaster program was used to calculate the normal depth and spread of cumulative flow generated from this basin, Basin GC1 and Tract B-1 drainage and the results are included in the appendix of this report.

This basin generates peak flows of 1.63 and 2.45 cfs for the 10 and 100 year storms, respectively.

Basin GC3: This basin contains most of the existing Golden Corral west parking area and was delineated to include both Basins DA No. 13 & 14 as depicted on the Golden Corral Drainage Plan submitted to the City Hydrology department June of 2010 (see plan in appendix). Basin GC3 (Basins DA No. 13 & 14) drains northwesterly and outlets through two existing curb cuts located along the west perimeter curb of the Golden Corral parking area shown as curb cuts No. 6 & 7 on the Golden Corral Plan. The existing curb cuts outlet to riprap rundowns that direct flows to the North Pond. The proposed Del Norte Dialysis Center improvements on Tract B-1 will not impact the existing infrastructure or drainage pattern within this basin. Basin GC3 was created for the sole purpose of calculating the overall peak flow tributary to the North Pond to establish a new 100 year water surface elevation. This basin generates peak flows of 3.42 and 5.15 cfs for the 10 and 100 year storm, respectively.

Basin P: This basin contains the North Pond including the pond expansion area (see pond expansion discussion below). Basin P was created for the sole purpose of calculating the overall peak flow tributary to the North Pond to establish a new 100 year water surface elevation. This basin generates peak flows of 1.12 and 2.05 cfs for the 10 and 100 year storm, respectively.

North Pond Expansion: The existing North Pond volume and footprint will be expanded to include additional drainage area contributed by the Del Norte parking area and the Golden Corral south drive aisle. The existing outlet structure system which includes a standpipe grate inlet (see Isaacson and Arfman detail on Temporary Drainage Plan) will remain intact and continue the calculated 1 cfs release rate to the Tract C-1 west perimeter channel.
The existing North Pond volume and the proposed expanded pond volume calculations are shown in a Civil 3d generated Pond Stage Volume Output Tables located in the appendix of this report.
Using data from a survey prepared April 8, 2015 (Survey included in the Appendix of this report), the existing pond volume was calculated to be 15,784 cf. The Isaacson and Arfman approved proposed provided pond volume is 15,694 cf. The calculated required North Pond expansion volume to accommodate the proposed site improvements is 7,176 cf. The calculated overall North Pond volume required to accommodate the proposed site improvements is 23,340 cf. See the Drainage Area Map for the North Pond Inflow/Outflow Hydrographs for the expansion and overall calculations. The overall proposed North Pond volume provided including the expanded volume is 23,493 cf at the pond contour elevation of 5197.00. The overall required peak volume of 23,340 cf creates a 100 year water surface elevation of 5,196.99 feet within the expanded pond. The resulting freeboard to the emergency spillway elevation of 5197.5 is a depth of 0.51 feet.

The first flush calculations for the Tract B-1 site are shown with the Basin Qpeak Analysis Tables. The required first flush storage volume to be retained is calculated to be 1004 cf. The North Pond invert elevation for the lowest orifice in the outlet structure system before release

to the west channel is 5195.6. The area of the 5295 lowest pond contour surrounding this outlet structure is 2187 sf. The depth to lowest outlet structure invert is 0.60' resulting in a provided 1,312 cf of retained storage volume prior to the release of pond flows to the west channel.

Hydrology Criteria

In keeping with the previous drainage studies performed for the Sandia Addition Tracts A, B, and C, the Peak Flow per Acre for small watersheds method outlined in the Design Process Manual (DPM), Section 22.2 uses the land treatment values listed in Table A-9 to calculate peak runoff for the for the respective storm. The Table A-9 land treatment values reflect the 12 minute time of concentration and produces similar if not slightly more conservative results of those calculated by the Manning Equation Q=CIA. Refer to the Appendix B Basin Qpeak Analysis spreadsheet for calculations of the composite peak flow for each basin.

The proposed pond expansion volume calculations will be based on the 100 year, 6 hour storm using the Weighted Excess Precipitation for the developed Peak flows as outlined in the DPM Section 22.2. The equations and calculations are included in the report appendix.

Hydraulic Criteria

Hydraulic criteria used for this analysis conforms to the City of Albuquerque DPM 22.3 Hydraulic Design. No variances from the criteria are requested. All proposed expanded detention pond volume, drainage channel (riprap rundown to pond) and parking area-drive aisle hydraulic calculations conform to the DPM Chapter 22. The drainage channel and parking area/drive aisle depth and spread were calculated using the Bentley Flowmaster V8i program. The pond volumes were calculated using the 2014 Civil 3d Grading Model. Additional calculations will be provided in the Final Drainage Analysis as directed by the City of Albuquerque Hydrology Department. See all hydraulic calculations for the expanded pond volume, drainage chase #1 and 2, the hydraulic depth and spread calculations for various basins and design points within the parking area and the south drive aisle in the appendix of this report.

Summary

The proposed Del Norte Dialysis Center site improvements within Tract B-1 will redirect site grades to drain to the northwest. All grading and storm system improvements including the Del Norte parking area and the Golden Corral south drive aisle are shown to adequately convey the developed peak flows without negative impacts to the existing infrastructure for the Golden Corral as well as the proposed Del Norte Dialysis building. The existing North Pond volume and footprint will be expanded to include additional drainage area contributed by the Del Norte parking area and the Golden Corral south drive aisle. The existing outlet structure system which includes a standpipe grate inlet (see Isaacson and Arfman detail on Temporary Drainage Plan) will remain intact and continue the calculated 1 cfs release rate to the Tract C-1 west perimeter channel. Moreover, the existing rock lined channel taking flows from the curb cut to

the existing channel along the Tract C-1 west perimeter (bypassing the existing pond) will be eliminated to include a new riprap channel/rundown that will drain tributary flows directly to the pond. Further reducing direct drainage to this existing west perimeter channel will be a huge improvement for the overall development and the adjacent property owners since there have been issues with this channel previously.

The existing pond volume was calculated to be 15,784 cf. The Isaacson and Arfman approved proposed provided pond volume is 15,694 cf. The calculated required North Pond expansion volume to accommodate the proposed site improvements is 7,176 cf. The overall proposed North Pond volume after the expanded volume is 23,493 cf exceeding the overall required volume of 23,340 cf at the pond contour elevation 5197.00. The overall required peak volume of 23,340 cf creates a 100 year water surface elevation of 5,196.99 feet within the expanded pond. The resulting freeboard to the emergency spillway elevation of 5197.5 is a depth of 0.51 feet.

The required first flush storage volume to be retained is calculated to be 1004 cf. The North Pond invert elevation for the lowest orifice in the outlet structure system before release to the west channel is 5195.6. The area of the 5295 lowest pond contour surrounding this outlet structure is 2187 sf. The depth to lowest outlet structure invert is 0.60' resulting in a provided 1,312 cf of retained storage volume prior to the release of pond flows to the west channel. All existing invert and grade elevations as provided in the existing survey dated April 8, 2015 (Survey provided in the Appendix of this report).

In addition, this analysis has shown that the Golden Corral south drive aisle has capacity to convey the increased peak flows contributed from the Tract B-1 site improvements. With all combined flows shown at Design Point 5, the calculated depth is 0.25' depth with a 15.1' spread for the 100 year storm. This drive aisle is considered to be a 'common area' defined in the Declaration of Easements, Covenants and Restrictions of the Sandia Addition title commitment and therefore can be used as a shared drainage way for the Sandia Addition Tracts (see highlighted sections included in the Appendix of this report).

In the unlikely case that the existing curb cut draining all tributary flows from the Golden Corral basins GC1 and GC2 and the Del Norte Dialysis site to the expanded North Pond becomes blocked (flow line elevation of 5199.3), this area will pond to a maximum depth of 6 inches (top of curb elevation of 5199.8), the accumulated flow will overtop the curb and flow down the proposed riprap pad directing flows to the pond. There would be no adverse impacts to any proposed or existing infrastructure in this scenario.

REFERENCES

1. **Design Process Manual, Volume II Design Criteria.**
   City of Albuquerque, Bernalillo County, New Mexico. April 1993.

2. **Flood Insurance Rate Map.**
   Community Panel No. 35001C01139G. Bernalillo County, New Mexico. Federal Emergency Management Agency. September 26, 2008.

3. **Temporary Detention Plan and Calculations.**
   Prepared by Isaacson & Arfman, P.A. Consulting Engineers and Associates. August 28, 2013.

4. **Drainage Impact Analysis for Golden Corral Restaurant.**
   Prepared by SMC Consulting Engineers, P.C. Revised May 28, 2010.

APPENDIX

Appendix A – Drainage Area Map & Drainage Plans of Previous Studies and associated documents
Appendix B - Hydrology
Appendix C – Hydraulics
Appendix D – Construction Plans

APPENDIX A – Basin Information & Drainage Plans of Previous Studies

Proposed Drainage Area Map
Existing Drainage Maps from previous studies
Prepared Survey of Existing Conditions
Title Commitment Declaration of Easement, Covenants and Restrictions

1895 - 5207 San Mateo Blvd. **Aug. 26, 2013**

Based on Drainage Design Criteria for City of Albuquerque Section 22.2, DPM, Vol 2, dated Jan., 1993

NORTH POND BASIN

AREA OF SITE: 128502 SF = 2.95 **acres**

100-year, 6-hour

DEVELOPED FLOWS:

		Treatment SF	%
Area A	=	0	0%
Area B	=	6425	5%
Area C	=	19275	15%
Area D	=	102802	80%
Total Area	=	128502	100%

EXCESS PRECIP:

Precip. Zone 2

$E_A = 0.53$

$E_B = 0.78$

$E_C = 1.13$

$E_D = 2.12$

On-Site Weighted Excess Precipitation (100-Year, 6-Hour Storm)

$$\text{Weighted } E = \frac{E_A A_A + E_B A_B + E_C A_C + E_D A_D}{A_A + A_B + A_C + A_D}$$

Developed E = 1.90 in.

On-Site Volume of Runoff: V360 = E*A / 12

Developed V_{360} = 20394 CF

On-Site Peak Discharge Rate: $Qp = Q_{pA}A_A + Q_{pB}A_B + Q_{pC}A_C + Q_{pD}A_D / 43{,}560$

For Precipitation Zone 2

Q_{pA} = 1.56 Q_{pC} = 3.14

Q_{pB} = 2.28 Q_{pD} = 4.70

Developed Q_p = 12.8 CFS

CALCULATIONS: 1895 - 5207 San Mateo Blvd. : Aug. 26, 2013
HYDROGRAPH FOR SMALL WATERSHED
DPM SECTION 22-2 * PAGE A-13/14

Base time, t_B, for a small watershed hydrograph is,

$tB = (2.107 * E * A / Q_P) - (0.25 * A_D / A)$

Where

E	=	1.90 inches
A	=	2.95 acres
A_D	=	2.36 acres
Q_P	=	12.8 cfs

t_B	=	0.72 hours

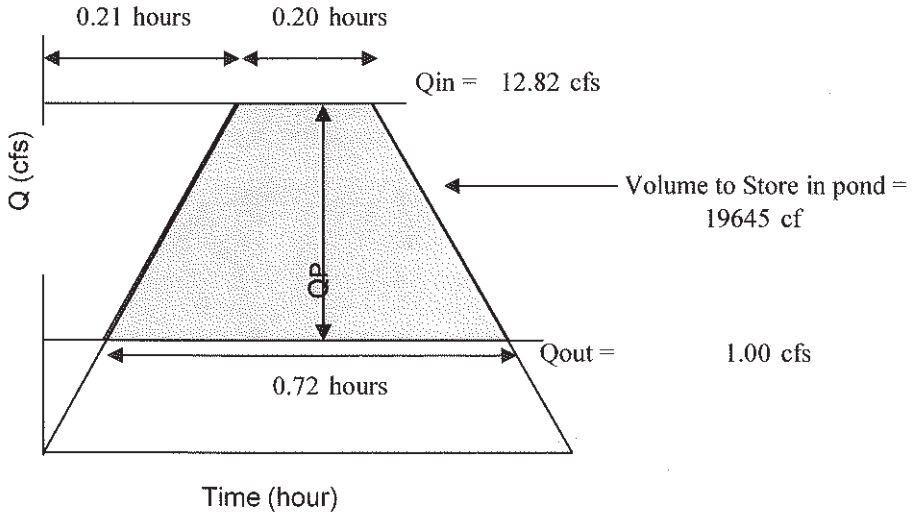
E is the excess precipitation in inches (from DPM TABLE A-8), Q_P is the peak flow, A_D is the area (acres) of treatment D, and A_T is the total area in acres. Using the time of concentration, t_C (hours), the time to peak in hours is:

$t_P = (0.7 * tC) + ((1.6 - (A_D / A)) / 12)$

Where t_C = 0.20 hours

t_P = 0.21 hours

Continue the peak for $0.25 * A_D / A_T$ hours. When A_D is zero, the hydrograph will be triangular. When A_D is not zero, the hyrograph will be trapezoidal. see the graph below:



NORTH BASIN INFLOW / OUTFLOW HYDROGRAPH

NORTH DETENTION POND		
Contour	Area	Volume
5197.00	12406	
5196.00	9793	11100 CF
5195.50	8585	4595 CF
TOTAL VOL.		**15694** CF

SOUTH DETENTION POND		
Contour	Area	Volume
5199.50	14474	
5199.00	13060	6884 CF
5198.00	10400	11730 CF
TOTAL VOL.		**18614** CF

9030189CSD Stewart Title

DECLARATION OF EASEMENTS, COVENANTS AND RESTRICTIONS

THIS DECLARATION OF EASEMENTS, COVENANTS AND RESTRICTIONS ("Declaration') is made this 28th day of July, 2010, by SANDIA FOUNDATION, a New Mexico non-profit corporation, its successors or assigns (the "Declarant"). GOLDEN CORRAL CORPORATION, a North Carolina corporation ("Golden Corral"), joins this Declaration with respect to that certain tract of land described as Tract A in Exhibit "A-1" (the "Tract A").

WHEREAS, Declarant currently owns the property described in Exhibit "A" consisting of Tract A and the remainder tract which Declarant has divided into two (2) separate tracts (collectively, the "Premises");

WHEREAS, Declarant intends to sell, convey and/or lease all or portions of the Premises to various separate entities as part of a general plan of developing the Premises;

WHEREAS, Declarant desires to develop the Premises for sale as an integrated development for the mutual benefit of each of the tracts and, therefore, wishes to establish certain easements, covenants and restrictions on the Premises;

WHEREAS, in order to preserve the quality and harmonious development of the Premises, the Declarant desires to impose upon the Premises certain protective covenants, conditions and restrictions governing the parking, access, drainage, utilities, landscaping, lighting, signage, maintenance and use of the Premises and of each of the tracts to be sold, conveyed and/or leased by the Declarant;

WHEREAS, the Premises including any of the tracts contained therein shall be sold, conveyed, and/or leased subject to these provisions;

WHEREAS, Golden Corral has contracted to purchase the Tract A from Declarant; and

WHEREAS, Declarant is willing to grant (a) Golden Corral a specific non-exclusive access easement over and across a portion of the remainder of the Premises for purposes of access to and from San Mateo Blvd. NE as shown and designated on Exhibit "A-2" (the "Corral Access Easement") and a shared parking easement (the "Shared Parking Easement") and (b) non-exclusive easements for purposes of signage and water, sewer and utility easements needed for the development of each Tract on the terms and conditions hereinafter stated in this Declaration.

NOW, THEREFORE, Declarant hereby certifies and declares that all of the Premises shall be owned, held, sold, leased, exchanged, conveyed, occupied, improved, maintained and used subject to the covenants, conditions and restrictions hereinafter set forth, all of which shall run with the right, title and/or interest in and to the Premises, and/or any part or parts thereof, and shall be binding upon and inure to the benefit of the present and all future owners of the Premises and/or any part or parts thereof.

DocH 2010077107
07/30/2010 12:01 PM Page: 1 of 22
DEC R:$51.00 M. Toulouse Oliver, Bernalillo County

ARTICLE I
DEFINITIONS

The following terms shall have the meanings specified below.

1.01. Tract A. A certain tract of land containing approximately 2.5064 acres, more or less, located within the Premises as is more specifically shown and designated and specifically described in Exhibit "A-1" hereto.

1.02. Building Area(s). The Building Areas in the Premises are the portions of the Premises upon which buildings or other improvements are constructed from time to time in accordance with approved plans and specifications approved by the City of Albuquerque and/or Bernalillo County, and shall consist of the area within or attached to the exterior surfaces of the exterior walls of any heated building or structure. The approximate location of the Building Areas, to the extent they are known at this time, is limited to the Tract A as shown on the Site Plan for Subdivision, the Site Plan for Building Permit, and the related grading, drainage, master utility, landscape and other plans, as approved by the City of Albuquerque, Bernalillo County, New Mexico, reference City of Albuquerque Project #1007867 and City EPC Case Numbers 09EPC – 400042 & 40043.

1.03. Common Area(s). The Common Areas are all real property within the Premises excluding the Building Areas and the Limited Common Areas; provided, those portions of the Building Areas upon which buildings are not constructed shall be deemed to be Common Areas until such time as the initial construction of buildings thereon commences. The Common Areas shall include, but not be limited to, parking lots, landscaping, lighting, curbs, sidewalks, drainage facilities, driveways and any other Common Area improvements as specifically designated and/or required by the City as Common Areas for the common benefit of the project.

1.04. Date Hereof. The Date Hereof shall mean the date of execution of this Declaration by all parties hereto, as evidenced by the date of the signatures as provided on the signature page of this Declaration.

1.05. Interest Rate. The Interest Rate shall mean the rate of eighteen percent (18%) per annum or two percentage points over the U.S. Prime Rate published in The Wall Street Journal in the latest edition thereof published prior to the date such interest commences, whichever is greater, provided that the Interest Rate shall not exceed the maximum rate permitted by law.

1.06. Limited Common Area(s). That portion of any Tract that is designated on a Site Plan as approved by the City of Albuquerque, Bernalillo County, New Mexico used with respect to specific Building Areas for the exclusive use by the owner of the Tract on which such improvements are located and its customers, invitees, licensees, agents and employees.

1.07. Majority Parties. The "Majority Parties" shall mean those Parties who, collectively, have fee simple title to a total of more than 50% of the square footage of land within the Tracts.

more in which twenty percent (20%) or more of the projected annual gross sales from the restaurant are from the sale of food served buffet style: (II) a Ryan's Family Steakhouse, Fire Mountain Grill, Furr's Cafeteria, Old Country Buffet, or a Hometown Buffet or (III) the following parking intensive users: tavern, bar, or cocktail lounge; restaurant that generates more than 50% of its gross sales from the sale of alcohol beverages; automobile, truck, trailer, or recreational vehicle sales, leasing display or repair facility; phone call center; theater; full service gym or full service health club; and a facility that caters primarily to students or trainees as opposed to customers.

5.03. Non-Interference with Common Area. The Common Area is intended for the nonexclusive use by the Occupants and Permittees.

ARTICLE VI
EASEMENTS

6.01. Ingress and Egress. Except as expressly provided by Article IX as to Tract A, Declarant declares, grants and conveys for the benefit of the each Tract, a non-exclusive easement appurtenant to each Tract for ingress and egress by vehicular and pedestrian traffic upon, over and across the Common Area. All easements referenced in this Section 6.01 shall be subject to all restrictions imposed on such uses by this Declaration; provided, such easements shall not pertain to the construction and/or maintenance of utility lines, which shall be governed by the provisions in Section 6.02 below. All such easements shall be as approved by the appropriate governmental authority and the appropriate utility company. Each future Tract owner, by taking title or by leasing its Tract subject to this Declaration, shall be deemed to have accepted such easement(s) with respect to the Common Area.

No fence or other barrier which would unreasonably prevent or obstruct the passage of pedestrian or vehicular travel for the purposes herein permitted shall be erected or permitted within or across the easement areas.

In connection with any construction, reconstruction, repair or maintenance on a Tract, each Tract owner reserves the right to create a temporary staging and/or storage area in the Common Area as will not unreasonably interfere with access between such Tract and the other areas of the Premises and public streets or roadways adjacent to the Premises.

6.02. Utility Lines/Drainage. Except as expressly provided by Article IX as to Tract A, Declarant declares, grants and conveys, for the benefit of each Tract, non-exclusive easements appurtenant to the Tract owned, an easement under, through and across the Common Area, to be specifically described and shown on the Site Plans, for the installation, maintenance, repair and replacement of water drainage systems, flows or structures, water mains, storm drains, sewers, telephone or electrical conduits or systems, gas mains or other public utility facilities necessary for the orderly development and operation of the Common Area and Tract; provided that all such improvements and utilities shall be approved, in writing, by the appropriate governmental authority(s) and utility company(s); provided, further, that the rights granted pursuant to such

easements shall at all times be exercised in such a manner as to cause the least interference with the normal operation of the development on the Premises.

All such systems, structures, mains, sewers, conduits, lines and other public utilities shall be, to the extent reasonably possible, installed and maintained below the ground level or surface of such easements. In the event any Tract owner deems it to be necessary to cause the installation of any utility line across the Common Area provided, however, that in no event will such installation be permitted if it would unreasonably interfere with the normal operation of any business on the Premises or the quiet enjoyment of the Premises or easements thereon by the Tract owner or their successor and/or assigns.

If in exercising the foregoing granted rights, a Tract owner disturbs or otherwise damages any portion of the Common Area improvements, such Tract owner shall expeditiously prosecute to completion the utility work, and at its sole expense, shall immediately restore and repair the Common Area improvements to their condition prior to the commencement of construction. In the event that it should be necessary to grant any of the foregoing easements and rights to the local utility companies as a condition of their providing or continuing service, such rights shall be granted so long as the Tract owner deems the terms and conditions of such grant to be reasonable and necessary.

6.03. Parking Restrictions. Except as expressly provided in Section 9.02 as to Tract A, no persons, other than customers, employees and invitees of the Occupants of the Premises, shall be permitted to park in the Limited Common Areas, unless the Tract owner of the respective Tract gives prior written approval thereto.

ARTICLE VII
INSURANCE PROVISIONS

Insurance. Each Tract owner agrees to maintain, or cause to be maintained, liability insurance against claims for bodily injury, death or property damage occurring on, in or about the Common Area within its Tract with a "Combined Single Limit" (covering bodily injury liability and property damage) of not less than One Million Dollars ($1,000,000.00). Such insurance may be in the form of blanket liability coverage applicable to the Tract owner's Tract and other property owned or occupied by the Tract owner or the party carrying such insurance coverage (or the responsible parent, subsidiary or affiliated companies of such Tract owner or party). Each Tract owner shall, upon request, provide the other Tract owners with evidence of such coverage. Each Tract owner as indemnitor shall indemnify, defend and hold harmless all other Tract owners from all claims, demands, liabilities, losses, costs and expenses with respect to the negligent and/or wrongful acts or omissions of the indemnifying Tract owner relating to construction, restriction, maintenance, use, operation, occupancy and/or management of any part of the Premises and/or with respect to the use by the indemnifying Tract owner and its tenants and Permittees of the easements granted in Article VI. Such indemnity shall not apply to the extent of any loss or claim due to or arising from the negligent or wrongful acts or omissions of the indemnified party.

the requesting Tract owner is not in default in the performance of its obligations under this Declaration, or if in default, to describe the nature and amount of defaults. Each Tract owner receiving such request shall execute and such return such certificate within thirty (30) days following the receipt thereof. The Tract owners acknowledge that such certificate may be relied upon the by third parties designated in the request by the Tract owner requesting such certificate.

10.10. Counterparts. This Declaration, and any amendment thereof, may be executed in any number of counterparts, each of which, when so executed, shall be deemed to be an original; and such counterparts together shall constitute one instrument.

In witness whereof, the undersigned have executed this Declaration effective as of the date first written above.

Sandia Foundation

By: _____
Name: Robert M. Goodman
Title: President & CEO

Golden Corral Corporation

By: _____
Name: Richard T. Chase
Title: VP Development

GOLDEN CORRAL CORPORATION CORPORATE SEAL NORTH CAROLINA

ACKNOWLEDGMENT

STATE OF NEW MEXICO)
)
COUNTY OF BERNALILLO)

THIS INSTRUMENT was acknowledged before me on 28th day of July, 2010, by Robert M. Goodman, President & CEO of Sandia Foundation, a non-profit corporation, on behalf of said corporation

_____
Notary Public

My Commission Expires: 5/9/2019

STATE OF NC)

COUNTY OF Wake)

THIS INSTRUMENT was acknowledged before me on 27 day of July, 2010, by Richard T. Chase Jr, VP-Dev. of Golden Corral Corporation, a North Carolina corporation, on behalf of said corporation.

_____
Notary Public

KATHRYN F. PAGE NOTARY PUBLIC WAKE COUNTY, NC

My Commission Expires:
April 1, 2014

APPENDIX B - Hydrology

Qpeak and Weighted E Pond Calculations

Basin Qpeak Analysis per DPM Section 22.2

Design Package: Del Norte Dialysis Center
Location: Albuquerque, NM 5207 San Mateo NE

Computed: KLR Date: 4/27/2015
Checked: Date:

Total Area Tract B-1 = 45541.71 sf 1.05 ac

10-year

Sub-Basin Data				Impervious Area		Zone 2 Land Treatment A				Zone 2 Land Treament B				Zone 2 Land Treament C				Zone 2 Land Treament D				Composite
Basin ID	Description	Total Area (sf)	Total Area (ac)	Area (ac)	Basin IMP	Qp $A_{(10\text{-}YR)}$ Table A-9	Area (sf)	Area (ac)	(Qp * Area (ac)) = Qp A (cfs)	Qp $B_{(10\text{-}YR)}$ Table A-9	Area (sf)	Area (ac)	(Qp * Area (ac)) = Qp B (cfs)	Qp $C_{(10\text{-}YR)}$ Table A-9	Area (sf)	Area (ac)	(Qp * Area (ac)) = Qp C (cfs)	Qp $D_{(10\text{-}YR)}$ Table A-9	Area (sf)	Area (ac)	(Qp * Area (ac)) = Qp D (cfs)	Basin Qpeak 10-Yr Total (cfs)
Proposed Conditions																						
A1	Pr Parking area north of building	6941.00	0.159	0.14	88.0%	0.38	0	0	0.00	0.95	834	0.019	0.02	1.71	0	0.000	0.00	3.14	6107	0.140	0.44	0.46
A2	Pr.Parking area south and west of building	16096.00	0.370	0.35	94.9%	0.38	0	0	0.00	0.95	818	0.019	0.02	1.71	0	0.000	0.00	3.14	15278	0.351	1.10	1.12
B	Proposed Building Roof drain to pipe	8535.00	0.196	0.20	100.0%	0.38	0	0	0.00	0.95	0	0.000	0.00	1.71	0	0.000	0.00	3.14	8535	0.196	0.62	0.62
R	Ex Access Drive and LS areas	8921.00	0.205	0.12	60.9%	0.38	0	0	0.00	0.95	709	0.016	0.02	1.71	2775	0.064	0.11	3.14	5436	0.125	0.39	0.52
OS1	Landscape area along south perimeter	3604.00	0.083	0.00	1.7%	0.38	0	0	0.00	0.95	180	0.004	0.00	1.71	3364	0.077	0.13	3.14	60	0.001	0.00	0.14
OS2	Landscape area along west perimeter	1427.00	0.033	0.00	2.4%	0.38	0	0	0.00	0.95	0	0.000	0.00	1.71	1393	0.032	0.05	3.14	34	0.001	0.00	0.06
GC1	Ex Tract A south drive aisle	14266.00	0.328	0.31	95.0%	0.38	0	0	0.00	0.95	0	0.000	0.00	1.71	713	0.016	0.03	3.14	13553	0.311	0.98	1.00
GC2	Ex Tract A south parking area	23087.00	0.530	0.50	95.0%	0.38	0	0	0.00	0.95	0	0.000	0.00	1.71	1154	0.026	0.05	3.14	21933	0.504	1.58	1.63
GC3	Ex Tract A west parking area	55223.00	1.268	1.12	88.1%	0.38	0	0	0.00	0.95	0	0.000	0.00	1.71	2561	0.059	0.10	3.14	48647	1.117	3.51	3.61
P	Ex North Pond Basin	28453.00	0.653	0.00	0.0%	0.38	0	0	0.00	0.95	0	0.000	0.00	1.71	28453	0.653	1.12	3.14	0	0.000	0.00	1.12
		Tract B-1 Total Impervious Area=			**77.8%**		Tract B-1 Land Treatment (A) Total =		**0.00%**		Tract B-1 Land Treatment (B) Total =		**5.58%**		Tract B-1 Land Treatment (C) Total =		**16.54%**		Tract B-1 Land Treatment (D) Total =		**77.84%**	

Basins (B)	Total 10-Yr Qpeak to Design Pt 1 =	0.62	cfs
Basins (A1)	Total 10-Yr Qpeak to Design Pt 2 =	0.46	cfs
Basins (A2+B)	Total 10-Yr Qpeak to Design Pt 3=	1.73	cfs
Basins (A1+A2+B+R+GC2)	Total 10-Yr Qpeak to Design Pt 4 =	4.34	cfs
Basins (A1+A2+B+R+GC2+GC1)	Total 10-Yr Qpeak to Design Pt 5 =	5.34	cfs
Basins (OS1+OS2) to Tract C-1	Total 10-Yr Qpeak to Design Pt C-1 =	0.20	cfs

100-year

Sub-Basin Data				Impervious Area		Zone 2 Land Treatment A				Zone 2 Land Treament B				Zone 2 Land Treament C				Zone 2 Land Treament D				Composite
Basin ID	Description	Total Area (sf)	Total Area (ac)	Area (ac)	Basin IMP	Qp $A_{(100\text{-}YR)}$ Table A-9	Area (sf)	Area (ac)	(Qp * Area (ac)) = Qp A (cfs)	Qp $B_{(100\text{-}YR)}$ Table A-9	Area (sf)	Area (ac)	(Qp * Area (ac)) = Qp B (cfs)	Qp $C_{(100\text{-}YR)}$ Table A-9	Area (sf)	Area (ac)	(Qp * Area (ac)) = Qp C (cfs)	Qp $D_{(100\text{-}YR)}$ Table A-9	Area (sf)	Area (ac)	(Qp * Area (ac)) = Qp D (cfs)	Basin Qpeak 100-Yr Total (cfs)
Proposed Conditions																						
A1	Pr Parking area north of building	6941.00	0.159	0.14	88.0%	1.56	0	0	0.00	2.28	834	0.019	0.04	3.14	0	0.000	0.00	4.70	6107	0.140	0.66	0.70
A2	Pr.Parking area south and west of building	16096.00	0.370	0.35	94.9%	1.56	0	0	0.00	2.28	818	0.019	0.04	3.14	0	0.000	0.00	4.70	15278	0.351	1.65	1.69
B	Proposed Building Roof drain to pipe	8535.00	0.196	0.20	100.0%	1.56	0	0	0.00	2.28	0	0.000	0.00	3.14	0	0.000	0.00	4.70	8535	0.196	0.92	0.92
R	Ex Access Drive and LS areas	8921.00	0.205	0.12	60.9%	1.56	0	0	0.00	2.28	709	0.016	0.04	3.14	2775	0.064	0.20	4.70	5436	0.125	0.59	0.82
OS1	Landscape area along south perimeter	3604.00	0.083	0.00	1.7%	1.56	0	0	0.00	2.28	180	0.004	0.01	3.14	3364	0.077	0.24	4.70	60	0.001	0.01	0.26
OS2	Landscape area along west perimeter	1427.00	0.033	0.00	2.4%	1.56	0	0	0.00	2.28	0	0.000	0.00	3.14	1393	0.032	0.10	4.70	34	0.001	0.00	0.10
GC1	Ex Tract A south drive aisle	14266.00	0.328	0.31	95.0%	1.56	0	0	0.00	2.28	0	0.000	0.00	3.14	713	0.016	0.05	4.70	13553	0.311	1.46	1.51
GC2	Ex Tract A south parking area	23087.00	0.530	0.50	95.0%	1.56	0	0	0.00	2.28	0	0.000	0.00	3.14	1154	0.026	0.08	4.70	21933	0.504	2.37	2.45
GC3	Ex Tract A west parking area	55223.00	1.268	1.12	88.1%	1.56	0	0	0.00	2.28	0	0.000	0.00	3.14	2561	0.059	0.18	4.70	48647	1.117	5.25	5.43
P	Ex North Pond Basin	28453.00	0.653	0.00	0.0%	1.56	0	0	0.00	2.28	0	0.000	0.00	3.14	28453	0.653	2.05	4.70	0	0.000	0.00	2.05
		Tract B-1 Total Impervious Area=			**77.8%**		Tract B-1 Land Treatment (A) Total =		**0.00%**		Tract B-1 Land Treatment (B) Total =		**5.58%**		Tract B-1 Land Treatment (C) Total =		**16.54%**		Tract B-1 Land Treatment (D) Total =		**77.84%**	

90th Percentile Storm Event Treatment for Water Quality

90th Percentile Runoff Depth =	0.44	inches	
Initial Impervious Abstraction (Table A-6) =	0.10	inches	
Required Treatment Depth (D) =	0.34	inches	
Sandia Addition Total Impervious Area (Land Treatment D) =	0.81	acres	
Required Retainment for Treatment (D x Imp Area)/12 in/ft=	**0.02**	acre-ft	**1,004** cf
Provided First Flush Volume =			

Basins (B)	Total 100-Yr Qpeak to Design Pt 1 =	0.92	cfs
Basins (A1)	Total 100-Yr Qpeak to Design Pt 2 =	0.70	cfs
Basins (A2+B)	Total 100-Yr Qpeak to Design Pt 3=	2.61	cfs
Basins (A1+A2+B+R+GC2)	Total 100-Yr Qpeak to Design Pt 4 =	6.59	cfs
Basins (A1+A2+B+R+GC2+GC1)	Total 100-Yr Qpeak to Design Pt 5 =	8.10	cfs
Basins (OS1+OS2) to Tract C-1	Total 100-Yr Qpeak to Design Pt C-1 =	0.36	cfs

Required North Pond Detention Volume Expansion Calculations

Project: Del Norte Dialysis Center
Address: Albuquerque, NM 5207 San Mateo NE
Tract B-1: 45541 ft^2 1.05 acres

Based on Drainage Design Criteria for City of Albuquerque Section 22.2, D.P.M., Vol 2

Excess Precipitation E (Inches)
100 Yr, 6 hr Storm
DPM Sect. 22.2 Table A-8

Zone	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.80	1.08	1.46	2.64

TABLE A-9. PEAK DISCHARGE (CFS/ACRE)

Zone	100-YR. Treatment [2-YR., 10-YR.]			
	A	B	C	D
1	1.29 [0.00, 0.24]	2.03 [0.03, 0.76]	2.87 [0.47, 1.49]	4.37 [1.69, 2.89]
2	1.56 [0.00, 0.28]	2.28 [0.08, 0.95]	3.14 [0.60, 1.71]	4.7 [1.86, 3.14]
3	1.87 [0.00, 0.58]	2.6 [0.21,1.19]	3.45 [0.78, 2.00]	5.02 [2.04, 3.29]
4	2.2 [0.05, 0.87]	2.92 [0.38, 1.45]	3.73 [1.00, 2.26]	5.25 [2.17, 3.57]

Basin Name: Tract B-1+Basin GC1
Precipitation Zone (1-4): 2
Area: 59790.00 ft^2 1.37 acres

Tract B-1 + Basin GC1 Excess Precipitation

Treatment	Area ft^2	Area acres	%	E inches
A	0.00	0.00	0.00%	0.53
B	2541.00	0.06	4.25%	0.78
C	8245.00	0.19	13.79%	1.13
D	49003.00	1.12	81.96%	2.12
Total	59789.00	1.37	100.00%	

1. Weighted E: $\frac{E_A A_A+E_B A_B+E_C A_C+E_D A_D}{A_A+A_B+A_C+A_D}$ = 1.93 inches

2. Onsite Volume of Runoff V_{360}:

V360 (Weighted E * A)/12 = 9,599 cf

3. Peak Runoff Qp 100-YR:

Qp $Q_A A_A+Q_B A_B+Q_C A_C+Q_D A_D$ = 6.01 cfs

(Qpeak value obtained from Basin Qpeak Analysis for the 100 year)

Hyrograph for Small Watershed

E = 1.93 inches
A = 1.37 acres
A_D = 1.12 acres
Q_p = 6.01 cfs

Note: E is the Excess Precipitation, Qp is the peak flow, A_D is the area of Treatment D, and A is the total contributing area to the north pond.

4. Base Time t_b
t_b: $(2.107*E*A/Q_p) - (0.25*A_D/A)$ = 0.72 hours
5. Time to Peak t_p
tp: (0.70*tc) + ((1.6 - (A_D/A)) /12 =
t_c = 0.20 hours
(tc is 12 minutes for small watersheds 40 acres or under)
t_p = 0.21 hours
6. (0.25*Ad/A) = 0.20 hours (Peak Duration)
7. Inflow/Outflow Hydrograph Area for Required Detention volume:
Q_p In = 6.01 cfs
Q_p Out = 1 cfs
***Required Detention Volume =** 7,176 cf
(*See hydrograph illustration on the Drainage Map for Hydrograph Area Calculations)

Overall North Pond Detention Volume Calculations

Project: Del Norte Dialysis Center
Address: Albuquerque, NM 5207 San Mateo NE
Tract B-1,Basins GC1-3, & P: 157,506 ft^2 3.62 acres

Based on Drainage Design Criteria for City of Albuquerque Section 22.2, D.P.M., Vol 2

Excess Precipitation E (Inches)
100 Yr, 6 hr Storm **DPM**
Sect. 22.2 Table A-8

Zone	A	B	C	D
1	0.44	0.67	0.99	1.97
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.80	1.08	1.46	2.64

Basin Name: Tributary Tract B-1 Basins +Basin GC1, GC2, GC3,
Precipitation Zone (1-4): 2
Area: 157,506 ft^2 3.62 acres

Tract B-1 + Basin GC1-3, P Excess Precipitation

Treatment	Area ft^2	Area acres	%	E inches
A	0.00	0.00	0.00%	0.53
B	2361.00	0.05	1.50%	0.78
C	35656.00	0.82	22.64%	1.13
D	119489.00	2.74	75.86%	2.12
Total	157506.00	3.62	100.00%	

1. Weighted E: $\frac{E_A A_A+E_B A_B+E_C A_C+E_D A_D}{A_A+A_B+A_C+A_D}$ = 1.88 inches

2. Onsite Volume of Runoff V_{360} :

V360 (Weighted E * A)/12 = 24,621 cf

3. Peak Runoff Qp 100-YR:

Qp $Q_A A_A+Q_B A_B+Q_C A_C+Q_D A_D$ = 15.95 cfs

(Qpeak value obtained from Basin Qpeak Analysis for the 100 year)

TABLE A-9. PEAK DISCHARGE (CFS/ACRE)

Zone	100-YR. Treatment [2-YR., 10-YR.] A	B	C	D
1	1.29 [0.00, 0.24]	2.03 [0.03, 0.76]	2.87 [0.47, 1.49]	4.37 [1.69, 2.89]
2	1.56 [0.00, 0.28]	2.28 [0.08, 0.95]	3.14 [0.60, 1.71]	4.7 [1.86, 3.14]
3	1.87 [0.00, 0.58]	2.6 [0.21,1.19]	3.45 [0.78, 2.00]	5.02 [2.04, 3.39]
4	2.2 [0.05, 0.87]	2.92 [0.38, 1.45]	3.73 [1.00, 2.26]	5.25 [2.17, 3.57]

Hyrograph for Small Watershed

E = 1.88 inches
A = 3.62 acres
A_D = 2.74 acres
Q_p = 15.95 cfs

Note: E is the Excess Precipitation, Qp is the peak flow, A_D is the area of Treatment D, and A is the total contributing area to the north pond.

4. Base Time t_b
t_b: $(2.107*E*A/Q_p) - (0.25*A_D/A)$ = 0.71 hours
5. Time to Peak t_p
tp: (0.70*tc) + ((1.6 - (A_D/A)) /12 =
t_c = 0.20 hours
(tc is 12 minutes for small watersheds 40 acres or under)
t_p = 0.21 hours
6. (0.25*Ad/A) = 0.19 hours (Peak Duration)
7. Inflow/Outflow Hydrograph Area for Required Detention volume:
Q_p In = 15.95 cfs
Q_p Out = 1 cfs
***Required Detention Volume =** 23,340 cf
(*See hydrograph illustration on the Drainage Map for Hydrograph Area Calculations)

Del Norte Dialysis Center North Pond Stage Storage Volume
Storage Volume Calculations Obtained by Civil 3D 2014
Date: 5/5/2015

Existing North Pond				
Contour Elevation	Contour Area	Depth	Incremental Volume Average End	Cumulative Volume Average End
	sf	ft	cf	cf
5,194.50	2.72	N/A	N/A	0
5,195.00	2,168.65	0.5	542.84	542.84
5,195.50	6,452.63	0.5	2155.32	2698.16
5,196.00	8,382.02	0.5	3708.66	6406.83
5,196.50	9,353.61	0.5	4433.91	10840.73
5,197.00	10,422.60	0.5	4944.05	15784.79
Proposed North Pond Expansion				
5,194.50	2.72	N/A	N/A	0
5,195.00	2,168.65	0.5	542.84	542.84
5,195.50	6,878.97	0.5	2261.91	2804.75
5,196.00	14,029.17	0.5	5227.04	8031.79
5,196.50	15,554.98	0.5	7396.04	15427.82
5,197.00	16,704.25	0.5	8064.81	23492.63

North Pond 100-Year Storage Vol. =	**23,340**	cf
North Pond 100-Year WSEL =	**5,196.99**	ft
Depth of Freeboard (Emerg. Spillway 5197.50) =	**0.51**	ft

WSEL Calculation includes
Total Area (basins)
Tributary to North Pond
(A1, A2, B, R, GC1-3, & P)

DPM Section 22.2 Notes Land Treatment Descriptions

Land Treatments Table A-4	
A	Soil uncompacted by human activity with 0 to 10 percent slopes. Native grasses, weeds and shrubs in typical densities with minimal disturbance to grading, ground cover and infiltration capacity.
B	Irrigated lawns, parks and golf courses with 0 to 10 percent slopes. Native grasses, weeds and shrubs, and soil uncompacted by human activity with slopes greater than 10 percent and less than 20 percent.
C	Soil compacted by human activity. Minimal vegetation. Unpaved parking, roads, trails. Most vacant lots. Gravel or rock on plastic (desert landscaping). Irrigated lawns and parks with slopes greater than 10 percent. Native grasses, weeds and shrubs, and soil uncompacted by human activity with slopes at 20 percent or greater. Native grass, weed and shrub areas with clay or clay loam soils and other soils of very low permeability as classified by SCS Hydrologic Soil Group D.
D	Impervious areas, pavement and roofs.
Most watersheds contain a mix of land treatments. To determine proportional treatments, measure respective subareas. In lieu of specific measurement for treatment D, the area percentages in TABLE A-5 may be employed.	

APPENDIX C – Hydraulics

Proposed Channel/Rundown and Curb Flow Calculations

West Parking Curb Basins A2 and B 100 Yr

Project Description

Solve For	Spread

Input Data

Channel Slope	0.00900	ft/ft
Discharge	2.61	ft³/s
Gutter Width	1.00	ft
Gutter Cross Slope	0.07	ft/ft
Road Cross Slope	0.03	ft/ft
Roughness Coefficient	0.013	

Results

Spread	7.43	ft
Flow Area	0.85	ft²
Depth	0.26	ft
Gutter Depression	0.04	ft
Velocity	3.08	ft/s

Cross Section for West Parking Curb Basins A2 and B 100 Yr

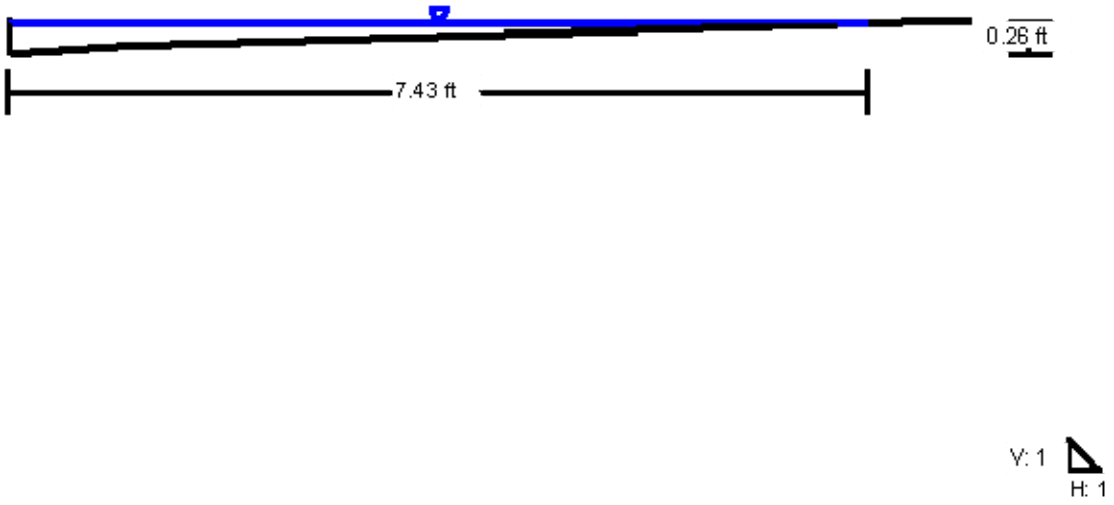
Project Description

Solve For	Spread

Input Data

Channel Slope	0.00900	ft/ft
Discharge	2.61	ft³/s
Gutter Width	1.00	ft
Gutter Cross Slope	0.07	ft/ft
Road Cross Slope	0.03	ft/ft
Spread	7.43	ft
Roughness Coefficient	0.013	

Cross Section Image



North Parking Curb Basin A1 100 Yr

Project Description

Solve For	Spread

Input Data

Channel Slope	0.03900	ft/ft
Discharge	0.70	ft³/s
Gutter Width	1.00	ft
Gutter Cross Slope	0.07	ft/ft
Road Cross Slope	0.03	ft/ft
Roughness Coefficient	0.013	

Results

Spread	3.19	ft
Flow Area	0.17	ft²
Depth	0.14	ft
Gutter Depression	0.04	ft
Velocity	4.05	ft/s

Cross Section for North Parking Curb Basin A1 100 Yr

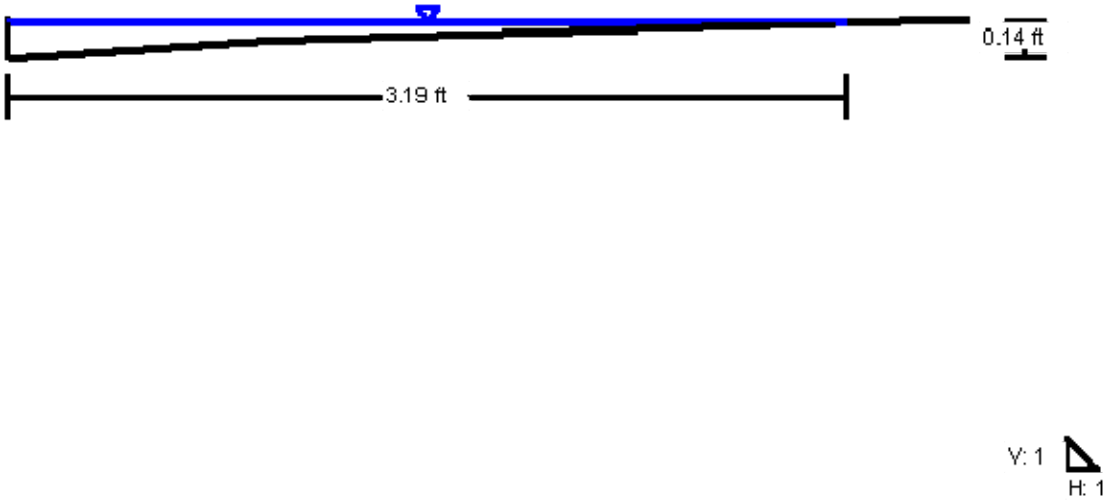
Project Description

Solve For	Spread

Input Data

Channel Slope	0.03900	ft/ft
Discharge	0.70	ft³/s
Gutter Width	1.00	ft
Gutter Cross Slope	0.07	ft/ft
Road Cross Slope	0.03	ft/ft
Spread	3.19	ft
Roughness Coefficient	0.013	

Cross Section Image



Drainage Chase #1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01700	ft/ft
Bottom Width	2.00	ft
Discharge	0.70	ft^3/s

Results

Normal Depth	0.11	ft
Flow Area	0.22	ft^2
Wetted Perimeter	2.22	ft
Hydraulic Radius	0.10	ft
Top Width	2.00	ft
Critical Depth	0.16	ft
Critical Slope	0.00555	ft/ft
Velocity	3.19	ft/s
Velocity Head	0.16	ft
Specific Energy	0.27	ft
Froude Number	1.70	
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	0.11	ft
Critical Depth	0.16	ft
Channel Slope	0.01700	ft/ft
Critical Slope	0.00555	ft/ft

Drainage Chase #1

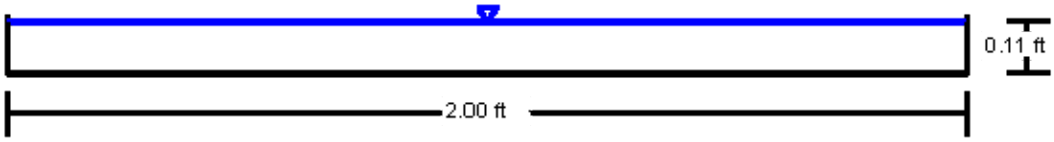
Project Description

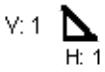
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01700	ft/ft
Normal Depth	0.11	ft
Bottom Width	2.00	ft
Discharge	0.70	ft³/s

Cross Section Image





Drainage Chase #2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.10000	ft/ft
Bottom Width	2.00	ft
Discharge	2.61	ft^3/s

Results

Normal Depth	0.14	ft
Flow Area	0.29	ft^2
Wetted Perimeter	2.29	ft
Hydraulic Radius	0.13	ft
Top Width	2.00	ft
Critical Depth	0.38	ft
Critical Slope	0.00522	ft/ft
Velocity	9.07	ft/s
Velocity Head	1.28	ft
Specific Energy	1.42	ft
Froude Number	4.22	
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	0.14	ft
Critical Depth	0.38	ft
Channel Slope	0.10000	ft/ft
Critical Slope	0.00522	ft/ft

Drainage Chase #2

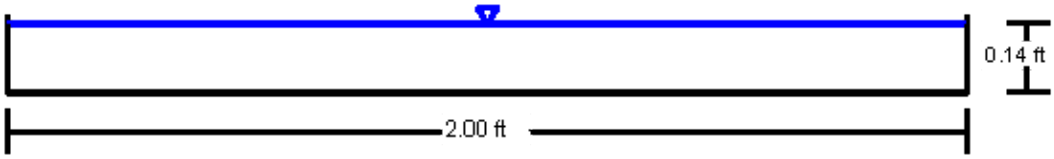
Project Description

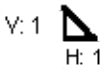
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.10000	ft/ft
Normal Depth	0.14	ft
Bottom Width	2.00	ft
Discharge	2.61	ft³/s

Cross Section Image





Golden Corral Drive Design Pt 4 100 Yr

Project Description

Solve For	Spread

Input Data

Channel Slope	0.03000	ft/ft
Discharge	6.60	ft³/s
Gutter Width	1.00	ft
Gutter Cross Slope	0.07	ft/ft
Road Cross Slope	0.02	ft/ft
Roughness Coefficient	0.013	

Results

Spread	10.84	ft
Flow Area	1.20	ft²
Depth	0.27	ft
Gutter Depression	0.05	ft
Velocity	5.50	ft/s

Cross Section for Golden Corral Drive Design Pt 4 100 Yr

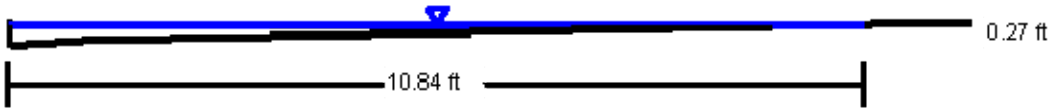
Project Description

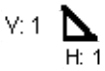
Solve For	Spread

Input Data

Channel Slope	0.03000	ft/ft
Discharge	6.60	ft³/s
Gutter Width	1.00	ft
Gutter Cross Slope	0.07	ft/ft
Road Cross Slope	0.02	ft/ft
Spread	10.84	ft
Roughness Coefficient	0.013	

Cross Section Image





Golden Corral Drive Design Pt 5 100 Yr

Project Description

Solve For	Spread

Input Data

Channel Slope	0.03700	ft/ft
Discharge	7.90	ft³/s
Gutter Width	1.00	ft
Gutter Cross Slope	0.07	ft/ft
Road Cross Slope	0.01	ft/ft
Roughness Coefficient	0.013	

Results

Spread	14.96	ft
Flow Area	1.43	ft²
Depth	0.24	ft
Gutter Depression	0.06	ft
Velocity	5.53	ft/s

Cross Section for Golden Corral Drive Design Pt 5 100 Yr

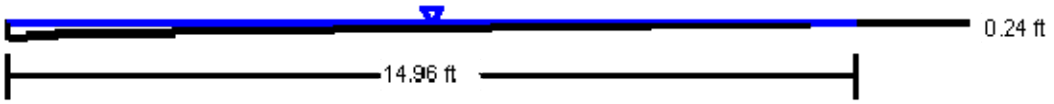
Project Description

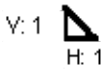
Solve For	Spread

Input Data

Channel Slope	0.03700	ft/ft
Discharge	7.90	ft³/s
Gutter Width	1.00	ft
Gutter Cross Slope	0.07	ft/ft
Road Cross Slope	0.01	ft/ft
Spread	14.96	ft
Roughness Coefficient	0.013	

Cross Section Image





North Pond Trapezoidal Channel (Rundown) 100 Yr

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.069	
Channel Slope	0.16700	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	8.00	ft
Discharge	7.90	ft^3/s

Results

Normal Depth	0.26	ft
Flow Area	2.37	ft^2
Wetted Perimeter	10.16	ft
Hydraulic Radius	0.23	ft
Top Width	10.10	ft
Critical Depth	0.30	ft
Critical Slope	0.10942	ft/ft
Velocity	3.33	ft/s
Velocity Head	0.17	ft
Specific Energy	0.43	ft
Froude Number	1.21	
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	0.26	ft
Critical Depth	0.30	ft
Channel Slope	0.16700	ft/ft

North Pond Trapezoidal Channel (Rundown) 100 Yr

GVF Output Data

Critical Slope	0.10942	ft/ft

Cross Section for North Pond Rundown100 Yr

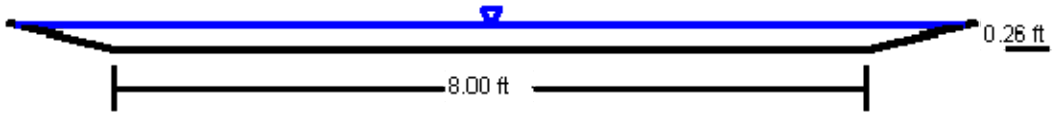
Project Description

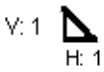
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.069	
Channel Slope	0.16700	ft/ft
Normal Depth	0.26	ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	8.00	ft
Discharge	7.90	ft³/s

Cross Section Image





APPENDIX D –Construction Plans

Grading Plans