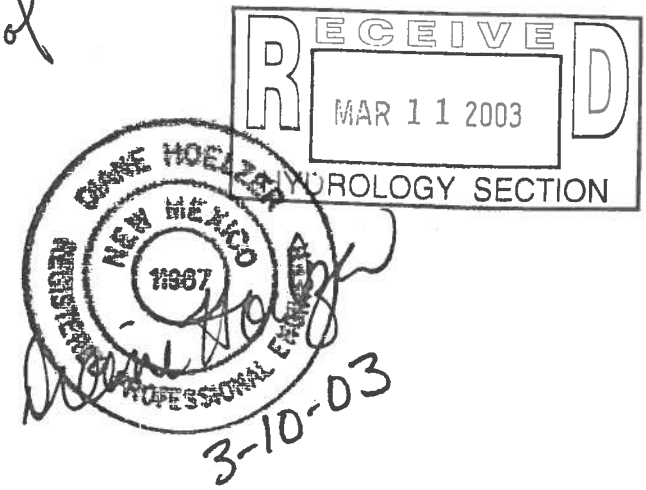
DRAINAGE REPORT

for

Desert Ridge Trails North

See Aug 8, 2003 sheet 5 1/2 of 38



3-10-03

MARCH 2003
DLH

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

March 10, 2003

Mr. Carlos Montoya
City of Albuquerque
Hydrology Dept.
PO Box 1293
Albuquerque, NM 87103

Re: Desert Ridge Trails North Subdivision ZAP C-19 (COA Rpt B19-D21)

Dear Mr. Montoya,

This letter is in response to your comment letters dated February 7 and February 13 and our subsequent meeting on March 3, 2003 with yourself, Fred Aguirre and Richard Dourte:

February 7th comment letter:

1. Per our March 3 meeting, offsite flows entering Wyoming Blvd. from the east just north of the future Florence Avenue will be intercepted by a temporary detention pond on Lot 32, Block 10 and then conveyed to the proposed storm sewer in Wyoming which will extend to Beverly Hills and then west to the temporary offsite retention pond on Lot 25, Block 2 This offsite ponds will each be granted as a temporary public drainage easement with an accompanying executed Agreement and Covenant with maintenance responsibilities being taken care of by the developer/owner or Home Owners Association.

   Offsite flows at the northeast corner of San Diego and Wyoming will be intercepted by a future double 'A' inlet to be constructed at the future curb return of the future Wyoming east lane. For the interim condition the double 'A' inlet box will be constructed with either a temporary Type D grate or beehive grate cover at the existing ground elevation.

   Offsite flows originating from Lot 1, Block 9 will be allowed to flow across Wyoming Blvd.and then be intercepted by a series of inlets along the west side of Wyoming Blvd. just south of the Beverly Hills intersection.

2. The NAA Master Drainage Plan (Figure 5) proposed that all of the flows from our project site and the offsite flows east of Wyoming which enter our site end up at AP 204.19. This drainage report is not changing the location where all the flows were proposed to ultimately converge in accordance with the NAA Master Plan. With the exception of the diversion of subasin 204.4 in a storm sewer in Florence, the NAA did not specifically address how the flows from subasin 204.1 or 204.3 were to be subdivided and conveyed to AP 204.19. Figure 6 shows the proposed NAA Master Plan ultimate conceptual storm sewer system. Our drainage plan is in compliance with the conceptual storm sewer design with the ultimate construction of a storm sewer outfall westward at the intersection of Louisiana and San Diego. The only change our plan has made is to divert subasin 204.4 north and west in Beverly Hills as opposed to in a storm sewer in Florence Avenue. In addition, as was indicated in our March 3 meeting, these flows may ultimately go south in Wyoming from Florence to another system in the future thus reducing the overall runoff contribution at Louisiana and San Diego. The downstream required improvements west of Louisiana will be equal to or less than the NAA Master Drainage Plan.

3. *The revised grading and drainage plan shows that the additional runoff from the north side of Florence Avenue as a result of construction from this project will be intercepted by an inlet on the north side of Florence at the intersection of Palm Yucca Drive. This inlet is already constructed and connected to the existing storm sewer system in Desert Ridge Trails. The Storm sewer analysis for this system was included in Appendix C as 'Stormplus Florence Avenue Diversion'.*

4. *The revised G&D plan gives all the required dimensions necessary to construct the pond for the required runoff capacity. Historically, as shown on the 'Existing Offsite Drainage Conditions Exhibit', runoff from our project site and offsite subasins 204.1AE, 204.1BE and 204.4AE have been diverted along the south side of and in Beverly Hills Avenue and then across Louisiana and back into the natural arroyo channel. Per our meeting on March 3, the proposal is to construct the south half of Beverly Hills from the west end of our project site to Louisiana Blvd. and divert any spillway flows from the pond in Beverly Hills westward across Louisiana and back into the arroyo. This will be accomplished in a 24' wide pavement section with curb and gutter along the south side and extruded curb along the north side.*

   The pond will be dedicated as a 'public drainage easement' and the standard 'Agreement and Covenant' will be executed with either the developer or the Home Owners Association being responsible for maintenance of the pond.

5. *Under existing drainage conditions, Lot 7,8 and 9 drain in a west to northwest direction. This historical flow pattern will not change with this development. At this time our client has control over Lot 9. The access issue has been resolved through the creation of a temporary turnaround easement as shown on the revised grading and drainage plan and as will be shown on the final plat.*

February 13th comment letter:

1. *A temporary storm sewer in Wyoming was not proposed. The intent of this drainage plan is to build the ultimate future storm sewer system with several temporary surface collection systems that could be converted to future inlets. Per our March 3 meeting the original intent and proposal is to build the required ultimate storm sewer, waterline, sanitary sewer and the west half of the Wyoming Blvd. pavement section as part of this project and intercept all the offsite flows east of Wyoming into the Wyoming storm sewer.*

2. *The Wyoming storm sewer has been designed as reflected on the revised grading and drainage plan. The stormplus 'Wyoming/Beverly Hills storm sewer analysis can be found in Appendix C.*

3. *Per your request I submitted the Drainage Report to Bernalillo County (Susan Calongne) and AMAFCA (Lynn Mazur). I have received comments from both of the them and have addressed their comments accordingly. (See accompanying letters and responses).*

4. *The storm sewer analysis was included in the original report in Appendix C. Refer to comment #3 for February 7th.*

5. *Per our March 3 meeting, the offsite retention pond has capacity for all the onsite project flows and the offsite paving improvements for Beverly Hills and Wyoming Blvd. for the 100 year 10 day storm. The offsite flows from subasins 204.1AE, 204.1BE and 204.4AE east of Wyoming will be routed throught the retention pond. It is my understanding that all parties were in agreement that any overflow from the retention pond would be diverted west along Beverly Hills to Louisiana in a proposed 24' pavement section with curb and gutter on the south side to be built in conjunction with this project.*

Please call me if you have any questions.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

Diane Hoelzer, PE
Senior Engineer

DLH/dlh
f:\\desert ridge trails north\dr_city_ltr.wpd

TABLE OF CONTENTS

Table of Contents - continued

I. PROJECT DESCRIPTION

The proposed Desert Ridge Trails North Subdivision comprises approximately 32 acres to be developed into 124 single family homes. The project site is located immediately north of the currently developing Desert Ridge Trails subdivision. The site is bounded by the future Wyoming Blvd. to the east, the future Beverly Hills Avenue to the north and the existing Sandia Sports Plex to the west and Florence Avenue to the south as shown on Figure 1 Vicinity Map.

II. DRAINAGE DESIGN CRITERIA AND PREVIOUS REPORTS

The design criteria used in this report was in accordance with Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, January 1993 edition. The 100-year 6-hour storm event was analyzed to determine street capacities using P(1 hr)=2.15", P(6 hr)=2.55". The onsite Land Treatment values used were Treatment D=45, Treatment C=27.5 and Treatment B=27.5 as determined using "Table A-5 Percent Treatment D" in the DPM. AHYMO printouts are provided in Appendix A.

III. EXISTING DRAINAGE CONDITIONS

Under existing drainage conditions, the south fork and the north fork of the El Camino Arroyo enter the site from the east near the intersection of Florence and Wyoming at the southeast quadrant of the project site. The south fork enters the southwest quadrant of this project from Florence Avenue. The north fork enters the project site from Wyoming Blvd. just north of the intersection with Florence Avenue.

As shown in Figure 2.1-2.3 the project site lies within the 100 year FEMA floodplain. A CLOMR request for "The La Cueva Arroyo I-25 East to Eagle Rock Avenue and The El Camino Arroyo Diversion Storm Drain" was made to FEMA and a CLOMR approval letter from FEMA was received on February 20, 2003 as shown in Figure 3.1 in this report. When all construction has been completed in accordance with the CLOMR, a LOMR request will be submitted and upon FEMA's approval, the revised floodplain will be as shown in Figure 3. The CLOMR will divert the entire south fork of the El Camino Arroyo to a sediment pond to be located in the northeast quadrant at the intersection of Glendale and Wyoming Blvd. Runoff from the sediment pond outfall will then be conveyed through a storm sewer to the La Cueva channel to the south which is under construction as part of the Desert Ridge Trails Subdivision.

Two additional small arroyos enter the project site from the east at Wyoming Blvd. The first arroyo crosses Wyoming at San Diego Avenue. The second arroyo enters the site just north of the first one just south of the Beverly Hills intersection. Refer to Pocket A: "Existing Offsite Drainage Conditions" Exhibit and Figure 4.

As shown Figure 3, afte the LOMR is received from FEMA for Desert Ridge Trails, a remnant floodplain wwill still lie within 4 lots of our project site. A CLOMR and LOMR request will need to be made to FEMA for the removal of this remnant floodplain from our project site. The CLOMR request will be submitted upon aprpoval of this drainage plan.

No offsite flows enter the site from the north, west or south. The developing Desert Ridge Trails to the south is eliminating offsite flows from enter the project site from Florence Avenue.

On the north side of the Sports Plex immediately south of Beverly Hills Avenue there is a diversion berm that deflects flows westward and away from the existing homes located on the north side of Beverly Hills Avenue to the existing arroyo path just west of Louisiana Blvd. There is also a graded swale on the south side of the unimproved Beverly Hills Avenue that conveys runoff to Louisiana where runoff is then conveyed west of Louisiana in the arroyos historical flow pattern.

IV. DEVELOPED DRAINAGE CONDITIONS

IV.A. N.A.A. Master Drainage Plan

This project site lies within the City of Albuquerque's "Final North Albuquerque Acres Master Drainage Plan", RTI, October 1998. As shown in Figure 5 "Future Conditions (NAA Master Drainage Plan)" the north half of this project site is part of Subasin 204.1 and the south half is part of Subasin 204.3. Runoff from Subasin 204.4 was conveyed to Louisiana in a 36" RCP storm sewer in Florence Avenue. At Florence and Louisiana runoff from Subasin 204.3 was added into the storm sewer and conveyed north in Louisiana and then west

towards I-25. Subasins 204.1 and 204.2 were conveyed to an I-25 crossing through a combination of storm sewer and a concrete lined channel and added to the runoff from Subasins 204.4 and 204.3 before crossing under the I-25 freeway as shown in Figure 6. The actual alignment of the channel and storm sewer west of Louisiana Blvd. has yet to be determined.

IV.B. Revised Proposed Master Drainage Plan

Figure 7 shows in detail the proposed revised future master drainage plan as part of the development of this project. The natural topographic fall of the land on this project site is towards the northwest. The project site will be graded so that all of the developed flows will be conveyed to the northwest corner through a combination of street flow, storm sewer and open channel. The overall fall in Wyoming Blvd. adjacent to this project is also towards the north. For this reason, the originally proposed 36" storm sewer in Florence is being proposed to be relocated in Beverly Hills Avenue.

The offsite flows from Subasins 1A, 1B and 4A as shown in Figure 7 and the 'Existing Offsite Drainage Subasins Map (Pocket A) are to be conveyed through a 42" RCP storm sewer north in Wyoming and then west in Beverly Hills to the west property line. The storm sewer is sized to convey the future 'developed' conditions flows. At some undefined future time when the existing Sports Plex property develops into a different use, this storm sewer will continue in Beverly Hills to Louisiana and then be conveyed either north or south before continuing west to the future I-25 crossing as shown in Figure 6. Any future alignment(s) will have to be determined at the time of development of the adjacent properties. Since the general relief of the land is in a westerly direction, there are numerous potential alignments that could work in the future depending upon how all of this vacant land west of Louisiana develops. For these reasons no specific alignment is being proposed at this time in conjunction with this project that differs from what is already proposed in the NAA Master Drainage Plan.

At the northwest corner of the project site the onsite and offsite flows are to be combined in the storm sewer and then routed through an offsite temporary retention pond located on Lot 25 immediately north and adjacent to the north side of Beverly Hills Avenue. This temporary retention pond is sized to contain the 100 year 10 day storm event for all the developed flows originating from this project site, Wyoming Blvd. and Beverly Hills Avenue. When the 'developed' flows from the project site and the 'existing' flows from the offsite subasins 1A, 1B, and 4A are routed through the offsite retention pond there is a peak discharge over the spillway of 75.1 cfs. When the 'developed' flows from the project site and the developed' flows from the offsite subasins 1A, 1B, and 4A are routed through the pond there is a peak discharge over the spillway of 45.4 cfs. It should be noted that these flows are still considerably less than the (+) 276 cfs that would currently flow towards Beverly Hills and then westward to the Louisiana/Beverly Hills intersection under 'existing' drainage conditions. Refer to Figure 4 where flows from subasins 204.0 and upstream from there are being removed and subasin 204.1 east of Wyoming is be diverted to the retention pond. All the AHYMO output files can be found in Appendix A.

The 'existing drainage conditions' flows from Subasins 1A, 1B and 4A will be routed through the pond. A spillway along the south side of the pond will allow overflow to discharge into Beverly Hills. It is proposed that overflow from the temporary retention pond be directed south across Beverly Hills and then west along a 24' wide curb and gutter pavement section to Louisiana Blvd. before spilling into the existing arroyo west of the Louisiana/Beverly Hills intersection. The diversion of these flows north in Wyoming and then west in Beverly Hills around our project site will allow some of the area in the Sport Plex to be removed from the floodplain while returning the overflow from the pond to the existing flow path of the floodplain downstream of the proposed diversions in Wyoming Blvd.

All of the developed flows in Florence Avenue are being diverted into the storm sewer in the Desert Ridge Trails subdivision (currently under construction). That projects onsite storm sewer was re-analyzed to verify that the additional developed flows from Florence Avenue could be received into that system. A portion of th onsite storm sewer within that project has already been upsized to accomplish these additional flows. The revised storm sewer analysis can be found in Appendix C.

Two inlet catch basins will intercept flows from subasins 1B and 4A into the Wyoming storm sewer. A temporary public detention pond on Lot 32 immediately northeast of the Florence / Wyoming intersection will detain flows for a short period before allowing runoff to enter the Wyoming storm sewer. At some future date when either Lot 32 develops or the east side of Wyoming Blvd. is constructed, this temporary pond will be eliminated. A public drainage easement will be granted and an 'Agreement and Covenant' will be executed by the owners of Lot 32 for this pond. The flows at San Diego and Wyoming will be intercepted by a double

inlet catch basin that will be converted to an inlet when the future east side of Wyoming Blvd. is constructed.

Summaries for onsite hydrology, street capacities and inlet interception can be found in Tables 1, 2 and 3. A Street Capacity and Subasin Boundary Exhibit can be found in Pocket A.

Federal Emergency Management Agency

Washington, D.C. 20472

FEB 20 2003

The Honorable Martin Chavez
Mayor, City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

IN REPLY REFER TO:
Case Number: 02-06-2430R

Community: City of Albuquerque,
Bernalillo County, New Mexico
Community No.: 350002

104

Dear Mayor Chavez:

This is in reference to a letter, dated August 27, 2002, from Carlos A. Montoya, Floodplain Administrator, City of Albuquerque, requesting a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA) for the proposed La Cueva Arroyo, I-25 East to Eagle Rock Avenue and the El Camino Arroyo Diversion Storm Drain. The proposed project will be located along the North La Cueva Arroyo from I-25 to Wyoming Boulevard and along the El Camino Arroyo from I-25 to approximately 350 feet upstream of Wyoming Boulevard. The proposed project will consist of channelization of the North La Cueva Arroyo and the construction of a sediment pond and diversion pipe on the El Camino Arroyo. The area of the proposed project is shown on Flood Insurance Rate Map (FIRM) numbers 35001C0129 E, 35001C0133 E, and 35001C0141 E, each dated April 2, 2002. This project also affects flood hazard information for Bernalillo County (Unincorporated Areas).

We received the following data, prepared by James D. Hughes, P.E., of D. Mark Goodwin & Associates, P.A., in support of this request:

- an AHYMO 97 hydrologic model, dated October 2, 2002, of the 1% annual chance flood, representing the proposed conditions for the North La Cueva Arroyo and the El Camino Arroyo;
- a drainage map, titled *Existing Conditions Basin Map*, dated December 26, 2001, at a scale of 1 inch = 500 feet, in support of the hydrologic model;
- a HEC-RAS hydraulic model, dated March 29, 2002, of the 1% annual chance flood, representing the proposed conditions for the North La Cueva Arroyo;
- HEC-RAS hydraulic models, dated January 10, 2002, of the 1% annual chance flood, representing proposed conditions for the El Camino Arroyo;

FIGURE 3.1 FEMA CLOMR LETTER

- certified design plans, dated March 18, 2002, at a scale of 1 inch = 300 feet, representing the proposed channelized stream details for the North La Cueva Arroyo and the proposed sediment pond and storm drain details for the El Camino Arroyo;

- topographic work maps, dated October 4, 2002 and January 9, 2003, titled *Color Work Map (2)* and *Color Work Map*, respectively, at a scale of 1 inch = 100 feet, with a contour interval of 2 feet, representing the 1% annual chance floodplain for the proposed project conditions along the North La Cueva Arroyo and the El Camino Arroyo;

- a report, titled *C.L.O.M.R. Request for the La Cueva Arroyo, I-25 East to Eagle Rock Ave. NE and the El Camino Arroyo Diversion Storm Drain*, submitted by D. Mark Goodwin & Associates, P.A., dated January 2002;

- copies of the Bernalillo County, New Mexico and Incorporated Areas FIRM numbers 35001C0129 E, 35001C0133 E, and 35001C0141 E, annotated to reflect proposed conditions; and

- completed application/certification forms, including community concurrence with the proposed project.

We received all of the data required to perform a technical review of the CLOMR request as of January 9, 2003.

We have reviewed the submitted data and determined that the proposed project meets the minimum floodplain management criteria of the National Flood Insurance Program (NFIP). If the project is built as proposed, a revision to the FIRM for your community will be warranted. This revision will show the following effects, as shown by the data submitted to support the request:

1% Annual Chance Floodplain (Zone A)

When the proposed conditions were compared to the effective conditions for the North La Cueva Arroyo, it was determined that the proposed project would cause decreases and shifting of the 1% annual chance floodplain. The maximum decrease, for the entire project area and your community, of 525 feet occurs approximately 775 feet upstream of San Pedro Drive, and the maximum shift of 325 feet occurs approximately 350 feet downstream of Louisiana Boulevard.

1% Annual Chance Floodplain (Zone AO)

When the proposed conditions were compared to the effective conditions for the El Camino Arroyo, it was determined that the proposed project would eliminate the 1% annual chance floodplain from Wyoming Boulevard to approximately 550 feet downstream of Wyoming Boulevard. The 1% annual chance discharge will be contained in the storm drain and routed to the North La Cueva Arroyo. In addition, the proposed project would cause decreases and shifting of the 1% annual chance floodplain for the entire project and your community, with a maximum decrease of 1,100 feet occurring approximately 1,200 feet downstream of

Louisiana Boulevard and a maximum shift of 300 feet occurring just downstream of Louisiana Boulevard.

Future revisions to the FIRM, or restudies of the flood hazards in this area, could modify this determination.

We based this determination on the 1% annual chance discharges computed in the submitted hydrologic model for the North La Cueva Arroyo and the El Camino Arroyo. Future development of projects upstream may increase discharges, which may increase flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and, therefore, could establish greater flood hazards in this area.

Your community must approve all proposed floodplain development, including this proposed project, and ensure that permits required by other Federal agencies and/or State and local agencies have been obtained. State and/or community officials may set standards for construction that are more restrictive than the minimum NFIP standards or may limit development in floodplains, based on knowledge of local conditions and in the interest of safety. If the State and/or the community have adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

Channel modifications, sediment pond outlet structures, and diversion pipes will fail to function as designed without proper maintenance, such as the regular clearing of the channelized stream, outlet structure, and diversion pipe. To avoid such failures, we require participating communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained according to NFIP regulations Subparagraph 60.3(b)(7). Therefore, upon completion of the project, your community must submit documentation ensuring that the modified channel, sediment pond, and diversion pipe will be maintained to preserve their design function. We may request that your community submit a description and schedule of its channel, sediment pond, and diversion pipe maintenance, as outlined in Subparagraph 65.6(a)(12) of the NFIP regulations.

Upon completion of the proposed project, your community should request a revision to the FIRM to assure that the physical change to the flooding conditions is used for flood insurance rating and floodplain management purposes. The revision request should be submitted to our Regional Office in Denton, Texas, and include the data listed below.

1. Evidence of compliance with NFIP regulations Paragraph 65.4(b), which states that "all requests for changes to effective maps...must be made in writing by the community's Chief Executive Officer (CEO) or an official designated by the CEO."

2. As-built plans of all relevant project elements and a statement declaring that the project was built as proposed, both of which must be certified by a Professional Engineer. Please provide digital copies of the as-built plans, if available.

3. Hydrologic analysis for as-built conditions of the 1% annual chance flood for the North La Cueva Arroyo and the El Camino Arroyo.

4. Hydraulic analyses for as-built conditions of the 1% annual chance flood for the North La Cueva Arroyo and the El Camino Arroyo.

5. Certified topographic mapping, delineating the 1% annual chance floodplains for the North La Cueva Arroyo and the El Camino Arroyo, representing as-built conditions.

    a. Please show this information on a map of suitable scale and topographic definition to provide reasonable accuracy.

    b. Please label all items for easy cross-referencing to the hydrologic model and summary data.

6. Copies of the Bernalillo County, New Mexico and Incorporated Areas FIRM numbers 35001C0129 E, 35001C0133 E, and 35001C0141 E, annotated to reflect as-built conditions.

7. Please submit documentation of individual legal notices that were sent to property owners who are adversely impacted by any increases in and/or shifting of the 1% annual chance floodplain for the North La Cueva Arroyo and the El Camino Arroyo.

    a. If you submit notification and acceptance from the adversely impacted property owners, FEMA can issue a Letter of Map Revision (LOMR) effective the date of issuance.

    b. If you submit notification of, but not acceptance by, the adversely impacted property owners, FEMA may issue a LOMR effective three to six months after the date of issuance.

8. Documentation showing compliance with NFIP regulations Subparagraphs 60.3(b)(7) and 65.6(a)(12) regarding maintenance.

If the project is built as proposed in the data submitted in support of this request, you do not have to resubmit items 3 through 5 listed above; otherwise, please resubmit them.

We have enclosed a copy of our application/certification forms for your reference. The application/certification forms package may be downloaded directly from the FEMA website at http://www.fema.gov/mit/tsd/en_main.htm or copies may be obtained by contacting the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627). Typically, we do not require all of these forms if the project is completed as proposed in the data submitted in support of this request. The enclosed document, titled *Requirements for Submitting Application/ Certification Forms to Support Requests for NFIP Map Revisions*, describes in detail the circumstances under which the forms are required.

The NFIP is primarily funded by policyholders, not taxes. We recover costs associated with reviewing and processing requests for modifications to published Flood Insurance Studies and FIRMs to minimize the financial burden on the policyholders. The fee for an as-built LOMR

request in follow-up to this CLOMR is $3,800, which we must receive before we can begin processing. This fee represents the fee schedule effective September 1, 2002. However, the fee schedule is subject to change, and the requester is required to submit the fee in effect at the time of the submission. Your payment must be a check or money order made payable to the National Flood Insurance Program and should be forwarded to:

Federal Emergency Management Agency
Fee Charge System Administrator
P.O. Box 3173
Merrifield, Virginia 22216

Once we receive the processing fee and the items listed above, complete our review, and verify that the completed project meets all applicable NFIP standards, we will revise your community's FIRM to incorporate the effects of the completed project, as appropriate.

Part 65 of the enclosed NFIP regulations further describes the data needed to support a request to revise the FIRM. Your compliance with the criteria outlined in the NFIP regulations will streamline our review, allowing us to expeditiously revise your community's FIRM.

If you have any questions regarding this CLOMR, please contact the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Kevin C. Long

Kevin C. Long, CFM, Project Engineer
Hazard Study Branch
Federal Insurance and
Mitigation Administration

For: Michael M. Grimm, Acting Chief
Hazard Study Branch
Federal Insurance and
Mitigation Administration

Enclosures

cc: Tom Rutherford, County Commissioner, Bernalillo County
Carlos A. Montoya, Floodplain Administrator, City of Albuquerque
Susan M. Calongne, P.E., Floodplain Administrator, Bernalillo County
James D. Hughes, P.E., D. Mark Goodwin & Associates, P.A.

DESERT RIDGE TRAILS NORTH
Onsite

TABLE 2 SUMMARY OF STREET CAPACITIES

LOCATION	CURB	CROWN	Width ft.	Slope %	Q cfs	Depth ft.	Velocity fps	EG ft.
Enchanted Sky	Mtb	Yes	28' FF	4.215	14.20	0.28	4.41	0.58
Enchanted Sky	Mtb	Yes	28'FF	4.215	13.00	0.27	4.29	0.56
Bear Mountain	Mtb	Yes	28' FF	0.905	12.93	0.35	2.46	0.44
Blue Moon	Mtb	Yes	28' FF	4.295	13.00	0.27	4.32	0.56
Pawnee	Mtb	Yes	28' FF	4.114	13.00	0.27	4.25	0.55
Pecos Trail	Mtb	2%CS	28' FF	4.375	11.26	0.32	5.01	0.71
Pecos Trail	Mtb	2%CS	28'FF	4.375	6.00	0.26	4.28	0.55
Pecos Trail	Std	Yes	28'FF	4.375	11.26	0.31	4.32	0.59
Pecos Trail	Std	Yes	28'FF	3.887	11.26	0.31	4.13	0.58
Pecos Trail	Std	Yes	28'FF	3.887	22.31	0.38	4.97	0.76
Pecos Trail	Std	Yes	28'FF	2.000	46.53	0.52	5.46	0.98
Pawnee	Std	Yes	28'FF	4.114	20.00	0.37	4.85	0.73
Blue Moon	Std	Yes	28'FF	4.295	26.00	0.39	5.45	0.85
Enchanted Sky	Std	Yes	28'FF	3.337	24.22	0.39	4.91	0.77
BlueMoon Culdesac	Std	Yes	28'FF	1.375	31.66	0.49	4.16	0.76

DESERT RIDGE TRAILS NORTH
Onsite

TABLE 3 SUMMARY OF STORM SEWER INLET INTERCEPT

LOCATION	Slope %	Q cfs	Depth ft.	INLET TYPE	INLET INTERCPT	ADD Q	TOTAL Q
Pecos Trail	3.887	22.31	0.38	2 SGL 'A'	12.40	24.22	34.13
Green Mesa	2.000	34.13	0.47	2 SGL 'C'	14.40	5.42	25.15
Green Mesa	0.600	25.15	0.52	2 DBL 'A'	13.20	20.00	31.95
Green Mesa	0.600	31.95	0.57	2 DBL 'A'	16.00	-	15.95
Green Mesa	0.600	15.95	0.46	2 SGL 'C'	9.2	-	(6.75)
Blue Moon	4.295	26.00	0.39	2 SGL 'A'	13.40	2.27	(14.87)
Blue Moon Culdesac	1.375					(9.04)	
Blue Moon Culdesac	1.375	31.66	0.49	2 DBL 'A' 1 SGL 'C'		Sump Inlet	(= 30.66)

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

PROJECT Desert Ridge Trails North
SUBJECT
BY DLH DATE 3-10-03
CHECKED DATE
SHEET OF

Offsite Retention Pond – Required Volume Calcs.

$V_{100DAY} = V_{6HR} + A_D\left(\frac{4.52" - 2.6"}{12}\right)$

SUBASIN

204.1C	3.855AF + (30.21AC)(.45)(.16)	= 6.030 AF	subdivi
204.1D	0.194 AF + (1.13AC)(.82)(.16)	= 0.342AF	RDs
204.1E	0.236AF + (1.325AC)(.85)(.16)	= 0.416AF	RDs
	REQ'D VOLUME	6.788AF	

DESIGN VOLUME = 7.0541 AC-FT

RUNOFF VOLUME TO RETENTION POND FOR 100YR 6HR

SUBASIN

204.1C	(DEV.)	3.855 AF	Subdivision
204.1AE	(EXIST)	0.771 AF	Bear Hills south
204.1BE	(EXIST)	0.581 AF	Softlogo
204.4AE	(EXIST)	4.385AF	Florence
204.1D	(DEV)	0.194AF	Bear Hill rd
204.1E	(DEV)	0.236AF	Wyoming rd
		10.022 AF	

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PROJECT: Desert Ridge Trails North
SUBJECT: Offsite Retention Pond
BY: DLH DATE: 3-10-03
CHECKED: _____ DATE: _____
SHEET ____ OF ____

VOLUME CALCULATIONS

ELEV. FT.	AREA SQ.FT.	VOLUME CU FT	Σ VOL. CUFT	Σ VOL. AC FT
5302.	6785	0	0	0
5304	8375	15132.1	15132.1	0.3474
5306	10125	18472.3	33604.4	0.7715
5308	12035	22132.5	55736.9	1.2795
5310	14105	26112.6	81849.5	1.8790
5312	16335	30412.7	112262.2	2.5772
5314	18725	35032.8	147295.0	3.3814
5316	21275	39972.9	187,267.9	4.2990
5318	23985	45232.9	232500.8	5.3375
5319	25400	49378.2	281879.0	6.4711
5320	25400	25400.0	307,279.	7.0541

$$\text{VOLUME} = \tfrac{1}{3} D(A_1 + A_2 + \sqrt{A_1 \cdot A_2})$$

$$Q(\text{SPILLWAY}) = CLH^{3/2}$$

$$47.7\text{cfs} = 3(45)(.5)^{1.5}$$

$$135.\text{cfs} = 3(45)(1.0)^{1.5}$$

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PROJECT Desert Ridge Tr. North
SUBJECT Offsite Tof Conc. Calcs.
BY _____ DATE _____
CHECKED _____ DATE _____
SHEET 2 OF 2

EXISTING CONDITIONS

	AREA (s.f.)	AREA (acres)	AREA (sq.mi.)		
204.1AE	471,287.4	10.81927	0.01691	57.03%	.02965
204.1BE	355,193.3	8.15412	0.01274	42.97%	
204.4AE	2,681,835.2	61.56646	0.09620	51.57%	0.1865
204.4BE	2,518,210.6	57.81016	0.09033	48.43%	

204.1AE

$$t_c = \frac{(1870\,LF)}{(2)10\sqrt{.0348}} = 501$$

$$+ \frac{400\,LF}{(0.7)10\sqrt{.0375}} + 295$$

$$796\,secs = 0.2212\,hrs$$

$$t_p = 2/3 \cdot t_c = 2/3(.2212\,hrs) = 0.147\,hrs.$$

204.1BE

$$t_c = \frac{400\,LF}{(0.7)10\sqrt{.0475}} = 262$$

$$+ \frac{1100\,LF}{(2.0)10\sqrt{.03545}} = 292$$

$$554\,secs = 0.1539\,hrs$$

$$t_p = 2/3(.15392) = 0.1026\,hrs \Rightarrow USE\ t_p = .1333\,hrs$$

204.4AE $K = 2.0$ $L = 5170\,LF$ $L_{CA} = 2020$ $K_N = 0.033$

$$S = \frac{5374 - 5518}{4770} = 0.032$$

$$t_c = \left[\frac{(12000 - 5170)}{72000(2)*(.032)^{.5}}\right] + \frac{(5170 - 4000)(.033)\left(\frac{2020}{5170}\right)^{.33}}{[552.2(.032)^{.165}]}$$

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PROJECT Desert Ridge Trails North
SUBJECT Offsite Time of Conc. Calcs
BY _____ DATE _____
CHECKED _____ DATE _____
SHEET 1 OF 2

$$t_c = \frac{6830}{25,759.5} + \frac{28.315}{312.929} = 0.265 + 0.0905 = 0.355 hrs$$

$t_p = 2/3(.35548 hrs) = 0.237 hrs.$

Existing Land Treatment per NAA Master Drainage Plan 10/28/98

A = 80
C = 10
D = 10

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PROJECT Desert Ridge North
SUBJECT Hydrology Calcs
BY DLH DATE 10-29-02
CHECKED ____ DATE ____
SHEET ____ OF ____

Florence 40' FF ULTIMATE 60' R/W SUBASIN 3A

Area = 26' wide × 1150' Long = 29,900 SF
200' taper × 16'/2 = 1,600 SF
sdwk 970 × 4 = 3,880 SF
pvmt 16' × 1150' = 18,400 SF

Total Area = .001130 sq. mi
29,900 + 1600 = 31500 SF
L.Tr. D = 76% ⇒ L. Tr. B = 24%
1600 + 3880 + 18400 = 23880

SUBASIN 204.1A and 204.4A
Assume 1 DU/Acre 43560 SF (264' × 165')

Impervious 2500 SF HOUSE + DW'Y
Frontage Rd. 2475 SF
4975 SF Use Land Tr. D = 12%
Land Tr. B/C = 44% EA.

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02d RUN DATE (MON/DAY/YR) =03/10/2003
INPUT FILE = DRTR_N.DAT USER NO.= AHYMO-I-9702dGoodwinM-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.550
COMPUTE NM HYD	204.1AE	-	1	.01691	22.46	.771	.85466	1.500	2.075	PER IMP= 10.00
COMPUTE NM HYD	204.1BE	-	1	.01274	18.49	.581	.85466	1.500	2.268	PER IMP= 10.00
COMPUTE NM HYD	204.4AE	-	1	.09620	92.42	4.385	.85466	1.600	1.501	PER IMP= 10.00
COMPUTE NM HYD	204.4BE	-	1	.09033	86.57	4.117	.85466	1.600	1.498	PER IMP= 10.00
COMPUTE NM HYD	204.1A	-	1	.01691	26.22	.896	.99370	1.500	2.423	PER IMP= 12.00
COMPUTE NM HYD	204.1B	-	1	.01274	21.44	.675	.99370	1.500	2.629	PER IMP= 12.00
COMPUTE NM HYD	204.1C	-	1	.04426	109.26	3.855	1.63318	1.500	3.858	PER IMP= 45.00
COMPUTE NM HYD	204.1D	-	1	.00177	5.14	.194	2.06089	1.500	4.539	PER IMP= 82.00
COMPUTE NM HYD	204.1DD	-	1	.00312	9.11	.344	2.06630	1.500	4.563	PER IMP= 80.00
COMPUTE NM HYD	204.2A	-	1	.06870	189.71	7.052	1.92474	1.500	4.315	PER IMP= 70.00
COMPUTE NM HYD	204.1E	-	1	.00207	6.21	.236	2.13768	1.500	4.689	PER IMP= 85.00
COMPUTE NM HYD	204.1EE	-	1	.00414	12.41	.472	2.13768	1.500	4.682	PER IMP= 85.00
COMPUTE NM HYD	204.1F	-	1	.06630	143.85	4.859	1.37423	1.500	3.390	PER IMP= 30.00
COMPUTE NM HYD	204.3A	-	1	.00107	3.01	.113	1.97658	1.500	4.406	PER IMP= 76.00
COMPUTE NM HYD	204.3B	-	1	.02813	68.38	2.395	1.59606	1.500	3.798	PER IMP= 42.00
COMPUTE NM HYD	204.3C	-	1	.02188	53.19	1.862	1.59606	1.500	3.799	PER IMP= 42.00
COMPUTE NM HYD	204.4A	-	1	.05460	91.82	2.894	.99370	1.500	2.628	PER IMP= 12.00
COMPUTE NM HYD	204.10	-	1	.12880	237.45	9.440	1.37423	1.550	2.881	PER IMP= 30.00
COMPUTE NM HYD	204.20	-	1	.06870	189.71	7.052	1.92474	1.500	4.315	PER IMP= 70.00
COMPUTE NM HYD	204.30	-	1	.08700	211.86	7.453	1.60624	1.500	3.805	PER IMP= 45.00
COMPUTE NM HYD	204.40	-	1	.05460	111.98	3.683	1.26487	1.500	3.204	PER IMP= 22.00
FINISH										

Hydrology for Summary Tables 4, 5, 7

APPENDIX C - STORM SEWER

Sump Inlet calcs.
Storm Sewer Analysis Wyoming / Beverly Hills
Storm Sewer Analysis Desert Ridge Trails North Onsite
Storm Sewer Analysis Desert Ridge Trails 'Florence Avenue' Diversion

CALCULATIONS FOR INLETS AT SUMP
for
Desert Ridge Trails North
Blue Moon culdesac

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the lowest adjacent right of way elevation. The length of the double grate facing the street is 6.5' and the maximum depth is 0.725' at the lip of the gutter. The sides are each 2' long and the average depth is 0.892'. These depths assume an 8" curb with right of way 9' behind the curb for an additional depth of 0.18' above the top of curb. From the weir equation:

BLUE MOON CULDESAC

FOR SINGLE 'C' INLET

*Front Q cap = (3.0) x (3.0') x (0.725) **1.5 = 5.56 cfs*

*Sides Q cap = (3.0) x (4.0') x (0.892) **1.5 = 10.11 cfs*

Total Q cap = 5.56 cfs + 10.11 cfs = 15.67 cfs

FOR DOUBLE 'C' INLET

*Front Q cap = (3.0) x (6.5') x (0.725) **1.5 = 12.04 cfs*

*Sides Q cap = (3.0) x (4.0') x (0.892) **1.5 = 10.11 cfs*

Total Q cap = 12.04 cfs + 10.11 cfs = 22.15 cfs

FOR TRIPLE 'C' INLET

*Front Q cap = (3.0) x (9.75') x (0.725) **1.5 = 18.06 cfs*

*Sides Q cap = (3.0) x (4.0') x (0.892) **1.5 = 10.11 cfs*

Total Q cap = 12.04 cfs + 10.11 cfs = 28.17 cfs

Sump inlets are typically designed to intercept 2 times the 100 year flow rate. The 100 year peak discharge to the sump inlets in Blue Moon is 30.66 cfs. In this scenario two double 'A' sump inlets and one single 'C' sump inlet will intercept up to 59.97 cfs which is 1.96 times the 100 year peak discharge.