Per the Drainage Report for Tract 1-A-2, Lands of Lamonica & Wenk, Albuquerque, NM by Tierra West LLC dated December 2010, Basin 4 and offsite Basin OS-1 will be collected in Pond 4.

MASTER PLANNED POND:

Master Plan Design volume of Pond 4 is shown as 6,025 cf.

Note that on-site Basin 4 per the master plan, was calculated as 45% Land Treatment B (grassy landscaping) and 55% Land Treatment D (impervious).

The Land Treatments for the other basins for this property (Basin 1 and 3) are similarly calculated with 17% and 25% Land Treatment B (grassy) which, when recalculated based on proposed areas and land treatments, will similarly increase the runoff from these basins as well.

The existing pond at a depth of 24" (see photo) per the topographic information provided has a capacity of 3,915 CF at a depth of 2.0'. This has a capacity to retain only 65% of the required master planned volume with no freeboard.

PROPOSED POND CONDITIONS:

The proposed on-site Basin 1 shown on the conceptual G&D draining to the existing Pond 4 is larger in area by 0.09 acres (compared to the Master Planned basin 4) but, more importantly, it is significantly more impervious area rather than grassy landscaping.

Proposed 100-year 10-day volume calculated to be stored in Pond 4 = 7,878 cf.

The existing pond at a depth of 24" (see photo) per the topographic information provided has a capacity of 3,915 CF at a depth of 2.0'. This has a capacity to retain only 50% of the proposed volume with no freeboard.

MASTER PLANNED CONDITION

BASIN NO. 4		DESCRIPTION		
Area of basin flows =	15131	SF	=	0.3 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.39 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 1746 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 1.2 cfs

LAND TREATMENT	
A =	0%
B =	45%
C =	0%
D =	55%

BASIN NO. OS-1		DESCRIPTION		
Area of basin flows =	13052	SF	=	0.3 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.76 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 1916 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 1.2 cfs

LAND TREATMENT	
A =	0%
B =	16%
C =	0%
D =	84%

Based on the calculations above, the 100-year 6-hour volume = 1,746 CF + 1,916 CF. Because the pond is retention, it is required to store the 100-year 10-day storm.

The 100-year 10-day storm event will generate the following volume:

Note: For ponds which hold water for longer than 6 hours, longer duration storms are required to establish runoff volumes. Since the additional precipitation is assumed to occur over a long period, the additional volume is based on the runoff from the impervious areas only.

P_{360}	
Zone	D
1	2.20
2	2.35
3	2.60
4	2.90

V_{360} (from previous calculation)	3663
Area Treatment D (SF)	19286
Zone	1

MASTER PLANNED B4 + BOS1

P_{10day}	
Zone	D
1	3.67
2	3.95
3	4.90
4	5.95

from Table A-2
Depth (inches) at 100-yr Storm

For 10 Day Storms:

$V_{10day} = V_{360} + A_D * (P_{10day} - P_{360})*43560$ SF/AC

V_{360}	=	3663
A_D (SF)	=	19286
Zone	=	1
P_{10day}	=	3.67
P_{360}	=	2.2

V_{360}	=	3663
+ imp. area	=	2363

Total Pond Volume ($V_{10\ day}$)	=	6025

The existing pond at a depth of 24" (see photo) per the topographic information provided has a capacity of 3,915 CF (designed for 6,025) at a depth of 2.0'. This has a capacity to retain only 65% of the required volume with no freeboard.

PROPOSED CONDITION

BASIN NO. OS-1		DESCRIPTION	Off-Site Coors Basin draining to POND 4
Area of basin flows =	13052 SF	=	0.3 Ac.

The following calculations are based on Treatment areas as shown in table to the right

LAND TREATMENT	
A =	0%
B =	16%
C =	0%
D =	84%

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.76 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 1916 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 1.2 cfs

BASIN NO. 1		DESCRIPTION	Proposed on-site Basin to POND 4
Area of basin flows =	19054 SF	=	0.4 Ac.

The following calculations are based on Treatment areas as shown in table to the right

LAND TREATMENT	
A =	0%
B =	13%
C =	7%
D =	80%

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.73 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 2751 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 1.7 cfs

In the proposed condition, with the entire building shown to discharge to the pond, the 100-year 10-day storm event will generate the following volume:

Note: For ponds which hold water for longer than 6 hours, longer duration storms are required to establish runoff volumes. Since the additional precipitation is assumed to occur over a long period, the additional volume is based on the runoff from the impervious areas only.

P_{360}	
Zone	D
1	2.20
2	2.35
3	2.60
4	2.90

V_{360} (from previous calculation)	4667
Area Treatment D (SF)	26207
Zone	1.29

PROPOSED CONDITIONS B1 + BOS-1

P_{10day}	
Zone	D
1	3.67
2	3.95
3	4.90
4	5.95

from Table A-2
Depth (inches) at 100-yr Storm

For 10 Day Storms:

$V_{10day} = V_{360} + A_D * (P_{10day} - P_{360})*43560$ SF/AC

V_{360}	=	4667
A_D (SF)	=	26207
Zone	=	1.29
P_{10day}	=	3.67
P_{360}	=	2.2

V_{360}	=	4667
+ imp. area	=	3210

Total Pond Volume ($V_{10\ day}$)	=	7878

The pond would need to be doubled in area or doubled in depth or a combination of the two.

PROPOSED SOLUTION

As mentioned above, it is expected that the remaining proposed basins will also generate more storm water than the Master Plan Design volume due to the land treatments used which will pose its own set of problems during the final G&D design. There is a possibility that an additional detention pond may be needed in the central landscaped parking island.

Our recommended solution would be to enlarge the west pond using the building walk edge as a vertical side and expanding the pond to the south side of the building.