APPENDIX F
JURISDICTIONAL AREA APPROACH

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EPA released a memo entitled "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs" in November 2002 clarifying EPA regulations regarding Waste Load Allocations (WLA) and Municipal Separate Storm Sewer Systems (MS4s) in TMDLs. In November 2008, EPA released the draft TMDLs to Stormwater Handbook to provide guidance to states as to how to include WLAs for MS4s in TMDLs. The handbook provides a number of options for states to consider when developing TMDLs that include MS4 allocations. One of the waterbody-based approaches to TMDL development includes the jurisdictional area approach:

"Jurisdictional area: loading capacity is allocated to permitted stormwater sources (and other land-based sources) on the basis of the portion of the drainage area included within their physical boundary. Without knowing the specific area draining to a stormwater conveyance system, the stormwater source area can be represented by the jurisdictional or operational area of the source (e.g., urbanized area for an MS4). For example, if the loading capacity is 100 lbs/day and the urbanized area of an MS4 represents 30 percent of the area draining to the assessment location, the MS4 WLA is specified as 30 lbs/day." (Section 4.3.2)

The handbook also gives specific direction on incorporating WLAs for MS4s in TMDLs developed using Load Duration Curves:

"TMDLs developed using the load duration approach most often identify the portion of the loading capacity for the stormwater WLA(s) on the basis of jurisdictional area. However, because the duration curve framework establishes a series of individual flow-variable loading capacities, the portion of each loading capacity attributed to individual sources typically will also vary by flow. Figure 19 illustrates a TMDL that was developed using a duration curve framework. In the Figure 19 example, stormwater WLAs for MS4 communities are based on the percent jurisdictional area approach. In this case, 3 percent of the watershed falls within the jurisdiction of MS4 communities. Thus, the MS4 WLA is 3 percent of the available allocation for each flow zone. The remaining 97 percent is designated for nonpoint sources and natural background as the LA for each zone." (Section 4.3.2.2)

The excerpts from the TMDLs to Stormwater Handbook provide the framework from which SWQB developed the WLA for the Phase I and Phase II MS4 permittees for each impaired Assessment Unit. However, the MRG-area presented two additional challenges. Unlike the 2002 Middle Rio Grande fecal coliform TMDL, the MRG E.coli TMDL includes both Phase I and Phase II MS4 permits. Additionally, the two permits each include jurisdictional area in the Rio Grande (Isleta Pueblo boundary to Alameda Bridge) and Rio Grande (non-Pueblo Alameda to Angostura Diversion) Assessment Units. As both AUs are also impaired for *E.coli*, TMDL calculations are therefore included for both AUs. The following explanation provides additional detail on these jurisdictional area calculations to supplement the information provided in Section 4.4.1.

Determination of Contributing Watershed Area

For the purposes of the MS4 WLA determinations, the contributing watershed is considered to be the Rio Grande drainage from Isleta Pueblo boundary to Cochiti Reservoir. This contributing drainage includes the USGS Hydrologic Unit Codes (HUCs) displayed in Figure F.1 and Table F.1. The total contributing area from the 8 HUCs is 2084.15 sq. mi.

As noted in Figure F.1, HUCs 1302020303 and 1302020302 do not contribute drainage to the Rio Grande (Alameda Bridge to Angostura Diversion) AU. Additionally, HUC 1302020301 only partially contributes to the Rio Grande (Alameda Bridge to Angostura Diversion) AU. The fraction that contributes to this AU (i.e. is upstream of the Alameda Bridge) was estimated to be 259 sq mi based on an east-west line drawn at the Alameda Bridge. Therefore, the total watershed area contributing to the Rio Grande (Alameda Bridge to Angostura Diversion) AU is the sum of these areas, totaling 1612.72 sq mi.

Phase I Permit Jurisdictional Area Approach

Four entities are authorized to discharge under the Phase I MS4 permit: City of Albuquerque, Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), New Mexico Department of Transportation District 3, and University of New Mexico. The Phase I permit states:

> *"This permit covers all areas, except agricultural lands, within the corporate boundary of the City of Albuquerque, New Mexico served by, or otherwise contributing to discharges from municipal separate storm sewers owned or operated by the permittees listed above."*

Based on the incorporated city limits of the City of Albuquerque from GIS coverages, the Incorporated Area of the City of Albuquerque was determined to be 188.08 square miles (sq. mi.). However, 7.2 sq. mi. fall into the Rio Grande (Alameda Bridge to Angostura Diversion) AU while 180.88 sq. mi. fall into the Rio Grande (Isleta Pueblo bnd to Alameda Bridge) AU, again this division is based on an east-west line drawn at the Alameda Bridge.

Therefore, for the Rio Grande (Isleta Pueblo bnd to Alameda Bridge) AU, the Phase I MS4 WLA is calculated as follows (see Table F.2):

Total jurisdictional area / Total contributing drainage area =
180.88 sq. mi. / 2084.15 sq. mi. = 8.68%

The Phase I MS4 WLA for the Rio Grande (Alameda Bridge to Angostura Diversion) AU is calculated as follows (see Table F.2):

Total jurisdictional area / Total contributing drainage area =
7.2 sq. mi. / 1612.72 sq. mi. = 0.45%

These calculations are summarized in Section 4.4.1. The Phase I MS4 WLA values used in the TMDL document were rounded from these percent jurisdictional estimates to 9% and 1%, respectively.

Phase II Permit Jurisdictional Area Approach

The nine sMS4 permittees eligible for coverage under the general Phase II MS4 permit are listed in Table 4.7. The Phase II sMS4 permit (NMR040000) reads:

> *"This permit authorizes the discharge of storm water from small municipal separate storm sewer systems (MS4s) provided the MS4 is located fully or partially within an urbanized area as determined by the 2000 Decennial Census."*

The Urbanized Areas (UA) upstream from the Isleta Pueblo boundry within the Rio Grande drainage was determined from GIS coverages to be 108.89 sq. mi.; 29.53 sq. mi. fall into the Rio Grande (Isleta Pueblo bnd to Alameda Bridge) AU and 79.35 sq. mi. fall into the Rio Grande (Alameda Street Bridge to Angostura Diversion) AU. This UA values exclude the Incorporated Area of the City of Albuquerque. For the purposes of the MS4 WLA determinations, the contributing watershed is considered to be the Rio Grande drainage from Isleta Pueblo boundary to Cochiti Reservoir. This contributing drainage includes the USGS Hydrologic Unit Codes (HUCs) displayed in Figure F.1 and Table F.1. The total contributing area from the 8 HUCs is 2084.15 sq. mi.

Therefore, for the Rio Grande (Isleta Pueblo bnd to Alameda Bridge) AU, the Phase II MS4 WLA is calculated as follows (see Table F.3):

Total jurisdictional area / Total contributing drainage area =
29.53 sq. mi. / 2084.15 sq. mi. = 1.42%

The Phase II MS4 WLA for the Rio Grande (Alameda Bridge to Angostura Diversion) AU is calculated as follows (see Table F.3):

Total jurisdictional area / Total contributing drainage area =
79.35 sq. mi. / 1612.72 sq. mi. = 4.92%

These calculations are summarized in Section 4.4.1. The Phase II MS4 WLA values used in the TMDL document were rounded from these percent jurisdictional estimates to 1% and 5%, respectively.

Thus, the total WLA assigned to each AU for both Phase I and Phase II permits is as follows:

Rio Grande (Isleta Pueblo bnd to Alameda Bridge): 9 + 1 = 10%
Rio Grande (Alameda Bridge to Angostura Diversion): 1+ 5 = 6%

Without rounding of these estimated values, the Rio Grande (Isleta Pueblo bnd to Alameda Bridge) WLA is 10.10% and the Rio Grande (Alameda Bridge to Angostura Diversion) WLA is 5.37%. In evaluating the potential impact, SWQB finds that, while the WLA is slightly smaller for the Rio Grande (Isleta Pueblo bnd to Alameda Bridge), this approach results in both a larger overall WLA allocation for MS4 permitees within the Middle Rio Grande and a 10% larger WLA for the Rio Grande (Alameda Bridge to Angostura Diversion) AU providing the permittees a larger WLA with which to work.

The remaining ninety percent was designated for nonpoint sources and natural background as the LA for each zone in the Rio Grande (Isleta Pueblo boundary to Alameda Street Bridge) AU. The remaining ninety four percent was designated for nonpoint sources and natural background as the LA for each zone in the Rio Grande (Alameda Street Bridge to Angostura Diversion). The WLA values for NMS000101 (Albuquerque Phase I MS4 permit) and NMR040000 (Phase II MS4s) are listed in Tables 4.11 and 4.12.

The TMDLs were calculated as described in Tables 4.4 and 4.5. From this calculated TMDL value, the Margin of Safety (MOS) and the NPDES permits were subtracted for each flow duration interval. In order to calculate the Phase I and Phase II MS4 permit WLAs, the percentages, derived using the jurisdictional area approach, were applied to the remaining TMDL quantity for each flow duration interval. For example, the high flow WLA for the Rio Grande (Isleta Pueblo bnd to Alameda Street Bridge) AU was calculated as follows:

TMDL –MOS* – NPDES WLA** = LA
$5.27 \times 10^{12} - 1.40 \times 10^{12} - 1.35 \times 10^{11} = 3.73 \times 10^{12}$ cfu/day

**as discussed in Section 4.7*
***note: sum of WLA for NM0022250 and NM0027873*

The MS4 WLAs were assigned as a percentage of the LA.
Phase I MS4 WLA = 9% and Phase II MS4 WLA = 1%, therefore;

NMS000101 WLA = 0.09 x 3.73×10^{12} cfu/day = 3.36×10^{11} cfu/day
NMR040000 WLA = 0.01 x 3.73×10^{12} cfu/day = 3.73×10^{10} cfu/day
Total MS4 WLA = NMS000101 WLA + NMR040000 WLA = 3.73×10^{11} cfu/day

The remaining available load is allocated to the LA. The final TMDL allocations read as follows:

TMDL – MOS – NPDES WLA – MS4 WLA = LA
$5.27 \times 10^{12} - 1.40 \times 10^{12} - 1.35 \times 10^{11} - 3.73 \times 10^{11} = 3.36 \times 10^{12}$ cfu/day

References:

US EPA, 2002. "Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs." Washington, D.C.

US EPA, 2008. TMDLs to Stormwater Permits Handbook (draft). Washington, D.C.

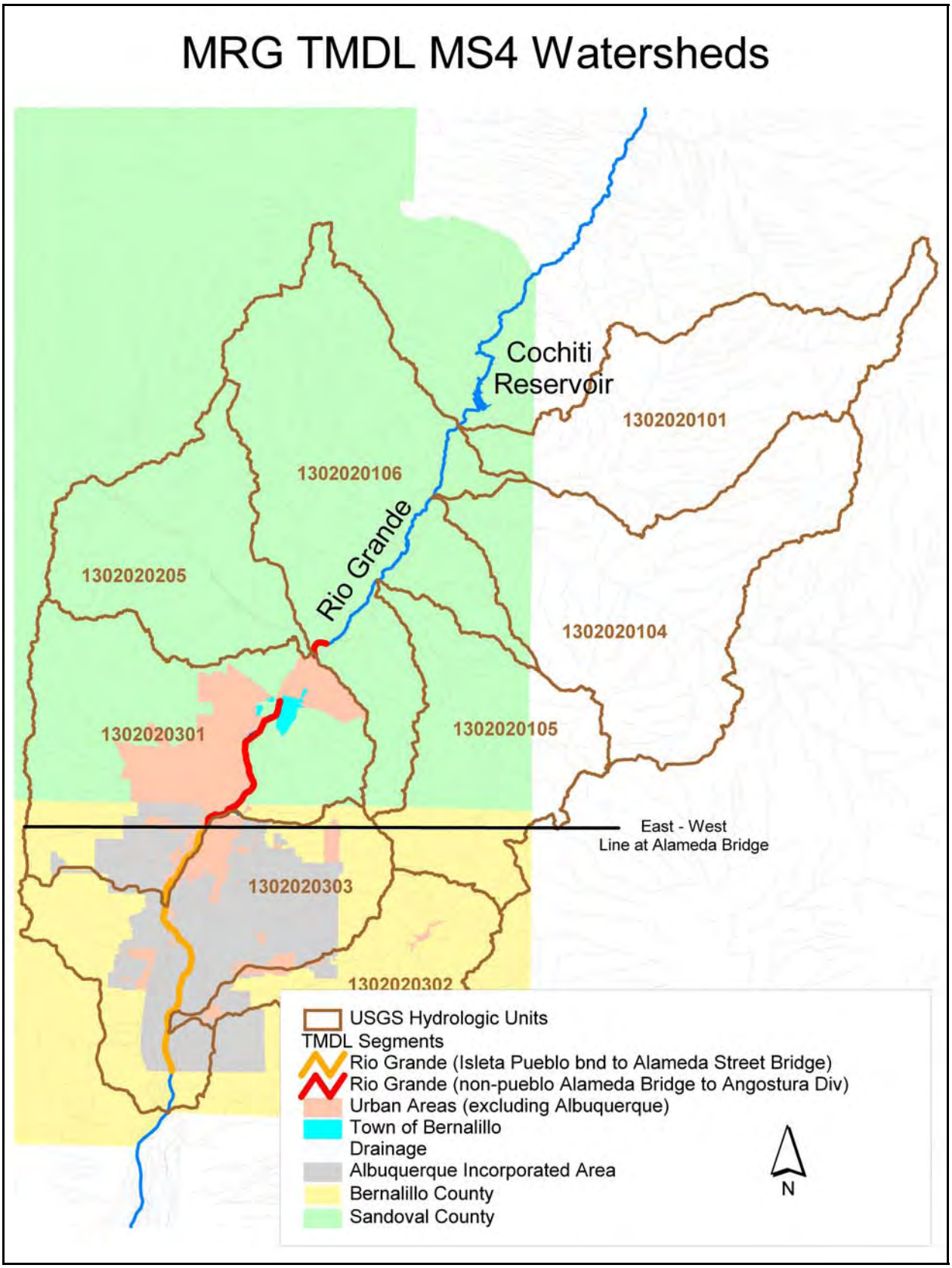

Figure F.1: Albuquerque-area MS4 jurisdiction

Table F.1: USGS Hydrologic Unit Code (HUC) areas

HUC	Total Area (sq mi)	Total Contributing Watershed Areas: Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	Total Contributing Watershed Areas: Rio Grande (Alameda Bridge to Angostura Div)
1302020301- Arroyo de Las Calabacillas-Rio Grande	329.97	329.97	259
1302020303 - City of Albuquerque-Rio Grande	268.72	268.72	n/a
1302020302 - Tijeras Arroyo	131.74	131.74	n/a
1302020106 - Arroyo Tonque-Rio Grande	388.81	388.81	388.81
1302020101 - Santa Fe River	256.06	256.06	256.06
1302020205 - Lower Jemez River	192.60	192.60	192.60
1302020104 - Outlet Galisteo Creek	322.37	322.37	322.37
1302020105 - Arroyo Tonque	193.88	193.88	193.88
Totals	**2084.15**	**2084.15**	**1612.72**

Table F.2: Phase I MS4 WLA allocations

	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	Rio Grande (Alameda Bridge to Angostura Div)
Incorporated Area of the City of Albuquerque (sq mi)	180.88	7.2
Total contributing watershed area (see Table F.1)	2084.15	1612.72
Percent jurisdictional area	**8.68%**	**0.45%**

Table F.3: Phase II MS4 WLA allocations

	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	Rio Grande (Alameda Bridge to Angostura Div)
Urbanized Area within Rio Grande drainage excluding Albuquerque (sq mi)	29.53	79.35
Total contributing watershed area (see Table F.1)	2084.15	1612.72
Percent jurisdictional area	**1.42%**	**4.92%**