

Addendum 1: Modeling Approach Description Appendix A2

This addendum was prepared at the direction of AMAFCA and the COA to address a hydrograph from a study conducted by URS Inc. titled the South Broadway Drainage and Stormwater Quality Management Plan. That study revealed that during a 100 year storm the Broadway storm drain system south of the Mid-Valley study area will surcharge. That excess flow will enter the Mid-Valley study area because it will drain north on Broadway towards the Broadway-Lomas intersection. This hydrograph or surcharge water is called the North Flow Hydrograph. For the existing conditions model, the entire hydrograph was added at the Broadway-Lomas intersection at manhole COA32878 since no storm drains were simulated south of the Broadway-Lomas intersection. This additional flow will cause flooding near the Broadway-Lomas intersection under existing conditions and will also exceed the capacity of the proposed Marble-Arno Pond (Facility 2). Therefore, the purpose of this Addendum is to evaluate additional Options to reduce flooding in the Mid-Valley study area as a result of the North Flow Hydrograph.

The URS study indicated that the North Flow 100-year hydrograph has a peak discharge of **228 cfs** with a peak volume of **10.9 ac-ft** with a time to peak at **6.28 hours** based on the NMDOT rainfall distribution.

The SEC model used an AHYMO Type II rainfall distribution which has a time to peak at 1.4 hours. Therefore, in order to see what effect the URS North Flow Hydrograph had on the proposed Marble-Arno Pond, SEC proceeded as follows:

The URS North Flow Hydrograph was translated so that the time to peak coincided with the SEC SWMM model hydrograph at approximately 1.3 hours before being added to the Existing Conditions and Future Conditions Option 51 model. This data is presented in **Appendix A2**.

The original proposed Marble-Arno Pond failed upon the inclusion of the North Flow Hydrograph. Therefore the following changes were developed to create the current the Proposed Option 51 Model:

Broadway South of Lomas to Tijeras

A proposed 36-in. storm drain was modeled from the intersection of Broadway-Tijeras to the intersection of Broadway-Lomas along with three additional manholes. The adjusted street surface area was computed based on a length of 1050 feet from the Broadway-Central to Broadway-Martin Luther King intersection based on methods specified in the original report Section 5 Table SP. The computations are included in **Table SP-A1, Appendix A2**. This street surface area was distributed equally to the three proposed manholes. The storm drain was modeled to outfall directly into the proposed Marble-Arno Pond.

At the beginning of the 36-in. storm drain, a 60-in. storm drain was modeled to drain directly to a proposed detention pond called the Tijeras Pond that was simulated at the northwest corner of Tijeras and Broadway. The purpose of the 60-in. storm drain and the Tijeras Pond was to divert and detain the North Flow Hydrograph. **See Figure 6-1.**

The pond was simulated to have a maximum depth of 14 feet with 1V:1H side slopes with a design storage volume of 7.68 ac-ft.

This pond was simulated to outfall with an 18-in. storm drain that joins into the 36-in. trunk line. The 36-in. storm drain continues north in Broadway and outfalls directly into the proposed Marble-Arno Pond.

The North Flow Hydrograph was split into two smaller hydrographs called North Flow 1 and North Flow 2 in order to distribute the flow more realistically. North Flow 1 contained two thirds of the original hydrograph while North Flow 2 contained one third of the original hydrograph from URS. North Flow 1 was derived by multiplying each ordinate of the URS North Flow Hydrograph by 2/3 while the North Flow 2 ordinates were multiplied by 1/3.

North Flow 1 was added at MH12 at the very beginning of the storm drain at Broadway-Tijeras while North Flow 2 was added at MH 11, just south of Broadway-Martin Luther King.

See **Figure A**.

At the Marble-Arno Pond

- The boundary of the pond was extended south along Arno to include the two smaller lots
- The top of the pond was offset 10 ft. from the right of way for accessibility
- Side slopes were maintained at 1V:1H for a total storage volume of 17.55 ac-ft.
- Maximum depth of the pond is 12 feet

See **Figure A** for modified pond layout.

Results Summary

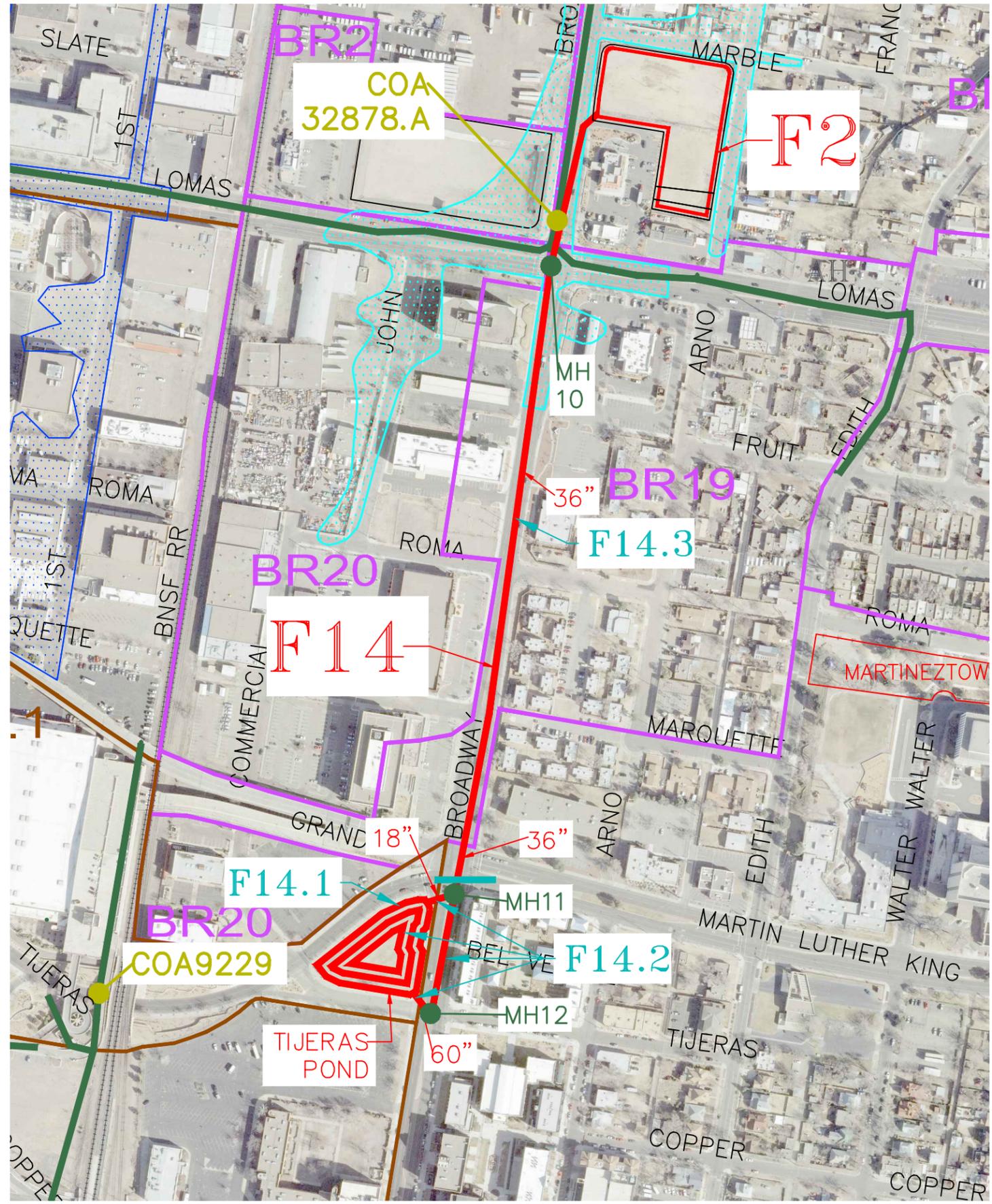
The existing conditions model results indicate significant flooding in the Broadway-Lomas intersection from the North Flow Hydrograph and also indicate the existing Broadway-Lomas Pond will fail. **Tables A1.1 and A1.2** summarizes the street – manhole flooding and the detention pond routing summary results, respectively. **Table A1.3** summarizes the feasibility to remove existing floodplains. Most floodplains can be removed with the LOMR process except for the following locations:

1. The floodplain near Indian School-Commercial intersection near I-40.
2. The floodplain near the Broadway-Lomas Intersection

These floodplains could be removed with implementation of the proposed facilities.

The proposed Tijeras Pond and associated storm drain eliminated the flooding described for existing conditions. The manhole flooding results are summarized in **Table A1.4**.

The proposed Marble –Arno Pond has 2.3 feet of freeboard and the Tijeras Pond has 1.1 feet of freeboard. The pond routing results are summarized in **Table A1.5**. There was minor flooding at the proposed manhole MH 11, which would be at the Broadway-Martin Luther King intersection, however the depth was 0.02 feet.



LEGEND

-  EXISTING STORM DRAIN & SWMM MODEL PIPES
-  B2 SUBCATCHMENT NAME
-  PROPOSED DRAINAGE FACILITY
-  F1 PROPOSED DRAINAGE FACILITY NAME
-  FACILITY PHASE LIMIT
-  F1.1 FACILITY PHASE NUMBER (LOWEST NUMBER IS HIGHEST PRIORITY)

FEMA FLOOD ZONE TYPES:

-  ZONE A
-  ZONE AE
-  ZONE AH
-  ZONE AO
-  ZONE X

CONCEPTUAL LEVEL COST ESTIMATE

F14.1	\$	683,000
F14.2	\$	871,000
F14.3	\$	1,215,000
TOTAL	\$	2,769,000

SUMMARY OF STREET PONDING DEPTHS FOR EXIST. DEVELOPMENT CONDITIONS AND PROPOSED DRAINAGE FACILITIES, 100-YR. 24-HR. STORM

-  **COA15184** MANHOLE STREET PONDING DEPTH GREATER THAN 1-FT
-  **COA7650** MANHOLE STREET PONDING DEPTH BETWEEN 0.5-FT AND 1-FT DEEP
-  **COA8045** MANHOLE STREET PONDING DEPTH BETWEEN 0-FT AND 0.5-FT DEEP



SCALE: 1"=300'

MID-VALLEY DRAINAGE MANAGEMENT PLAN
 FOR THE CITY OF ALBUQUERQUE &
 ALBUQUERQUE METROPOLITAN ARROYO
 FLOOD CONTROL AUTHORITY
ADDENDUM 1: July 17, 2012
 SEC PROJECT NO. 110112
PROPOSED FACILITY
F14
FIGURE A