Association of Montana Floodplain Managers

South Hills Flood Control Project Missoula, MT

Completed 2004

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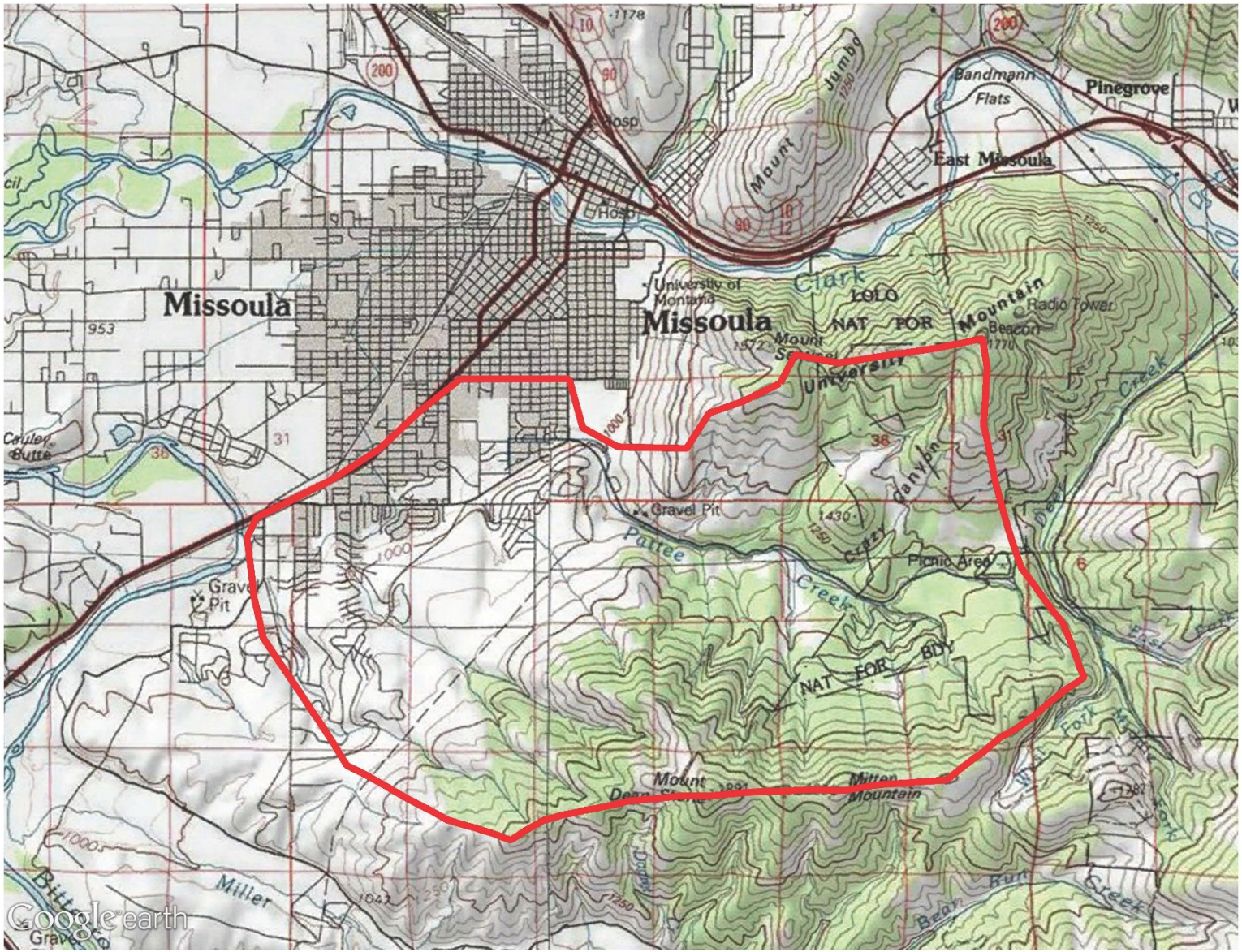
Missoula • Helena • Kalispell

Location



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Issues

- 1960 to 1990: Rapid Development → Urbanized Floodplain
- Frequent Flooding → +5-year Event!
- Transportation System Disruption
- Regular Sandbagging
- City Maintenance Burden
- 100's of Homes Required Flood Insurance
- Emergency Access Issues

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Timeline

1977 – Storm Drainage Management Plan for the South Hills Area (TD&H)

1980 – South Hills Drainage Project (Morrison-Maierle)

1981 – Supplement to South Hills Drainage Project (Morrison-Maierle)

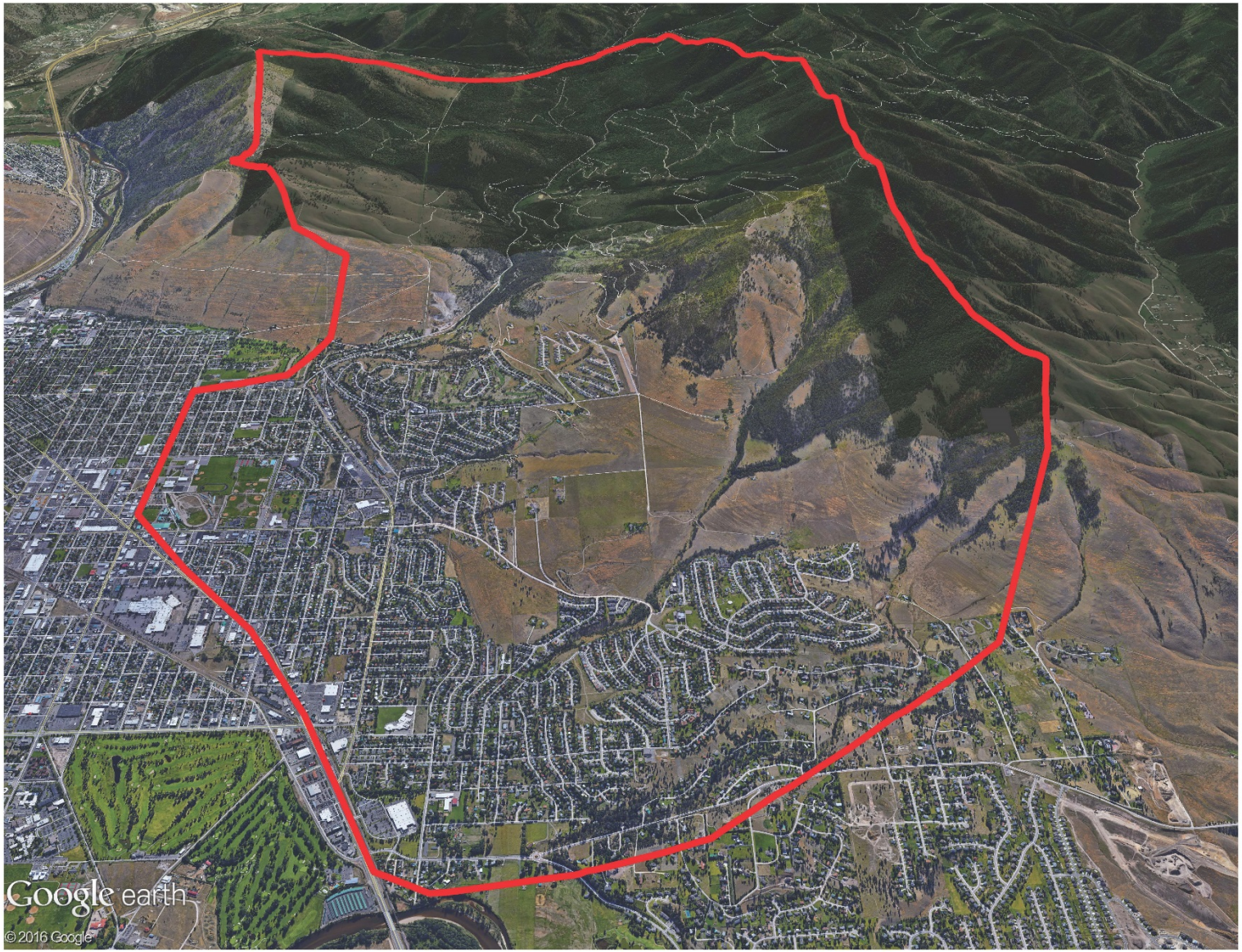
1986 – SID formed to fund lower watershed storm drain

1988 – FEMA FIS and Maps

1997 – MDT 39th Street Project and South Hills Flood Control Project

2004 – Project Completion

Location



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Pattee Creek

- Drainage Area
  - 16 mi^2 - 9 mi^2 rural; 7 mi^2 urban
  - Alluvial Fan
- Record Event 1980
  - 1.9” 24-hr event preceded by full month of rain
  - Mt. Saint Helens Eruption – Volcanic Particles?!?
  - Ash clogged sumps, caused super storm (maybe)
  - +100-year runoff event for Pattee Creek – 200 cfs
  - 2.6” 24-hr = 100-year
- Missoula huge reliance on sumps ~7,000 in City
- Infiltration Rates Up to 9 in/min - Measured !!
- Sumps ok during common events, but overwhelmed by Pattee Creek overflow

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The Fix

- Spur – 39th Street Reconstruction Project
- Piping, open channels, infiltration, and storage
- CLOMR/LOMR
- Innovative Funding

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The Funding Dream Team

- $11.8M Project Total
  - Federal Surface Transportation Program ($2.54M)
  - Federal Congestion Mitigation & Air Quality Fund ($1.99M)
  - Federal Surface Transportation Program ($208K)
  - FEMA Hazard Mitigation Grant ($394K)
  - New SID - Valley and Hillside ($4.58M)
  - State Revolving Loan Fund ($1.44M)
  - City of Missoula Federal Gas Tax Fund ($240K)
  - Sidewalk Assessment to Adjacent Lands ($333K)
  - Public Utility Relocation Cost ($100K)

LOMR: "The complexity of the various funding sources and their individual restrictions, limitations, and regulatory requirements will likely never be able to be assembled again by the City of Missoula."

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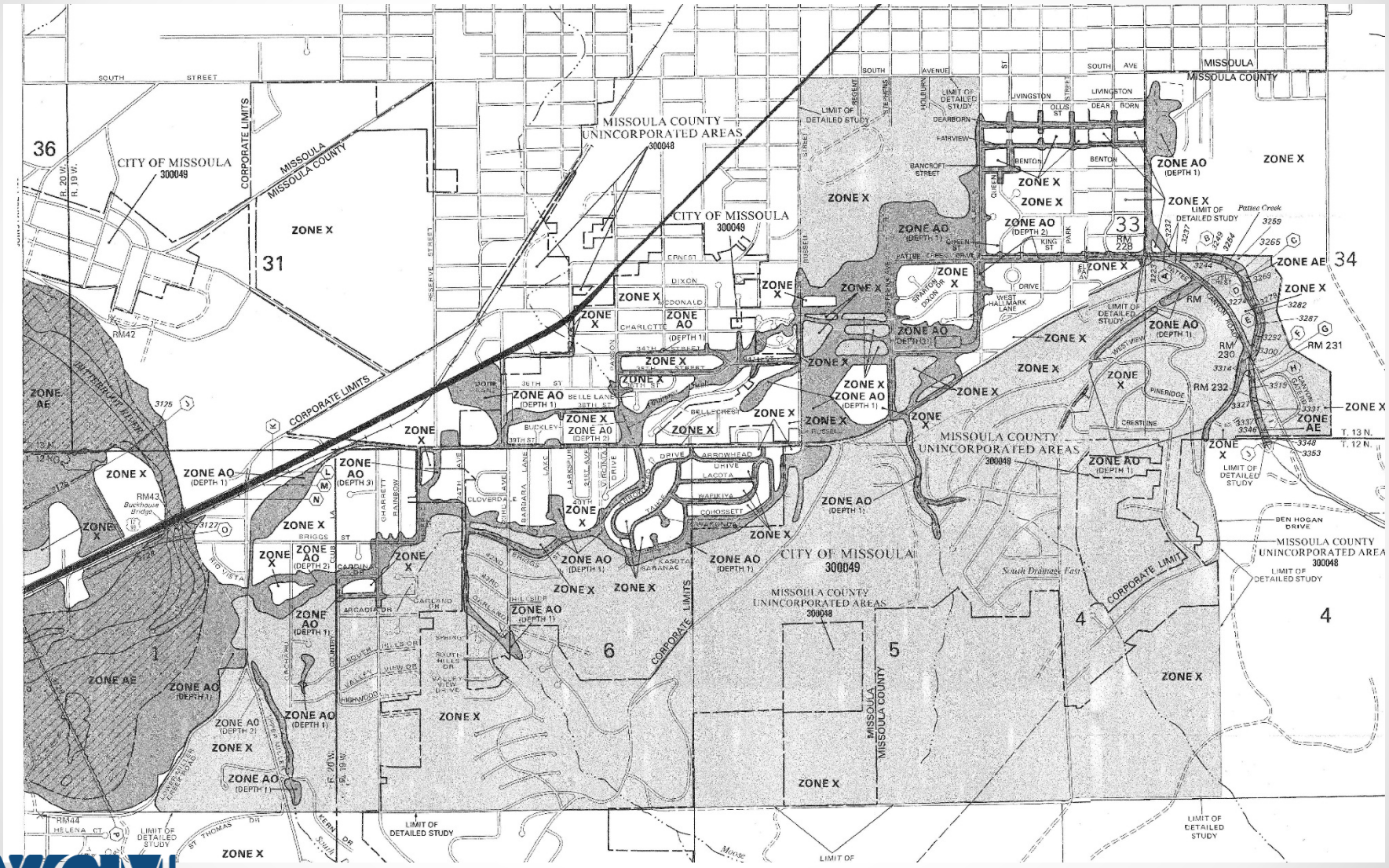
1988 FIRM



Messy urban floodplain!

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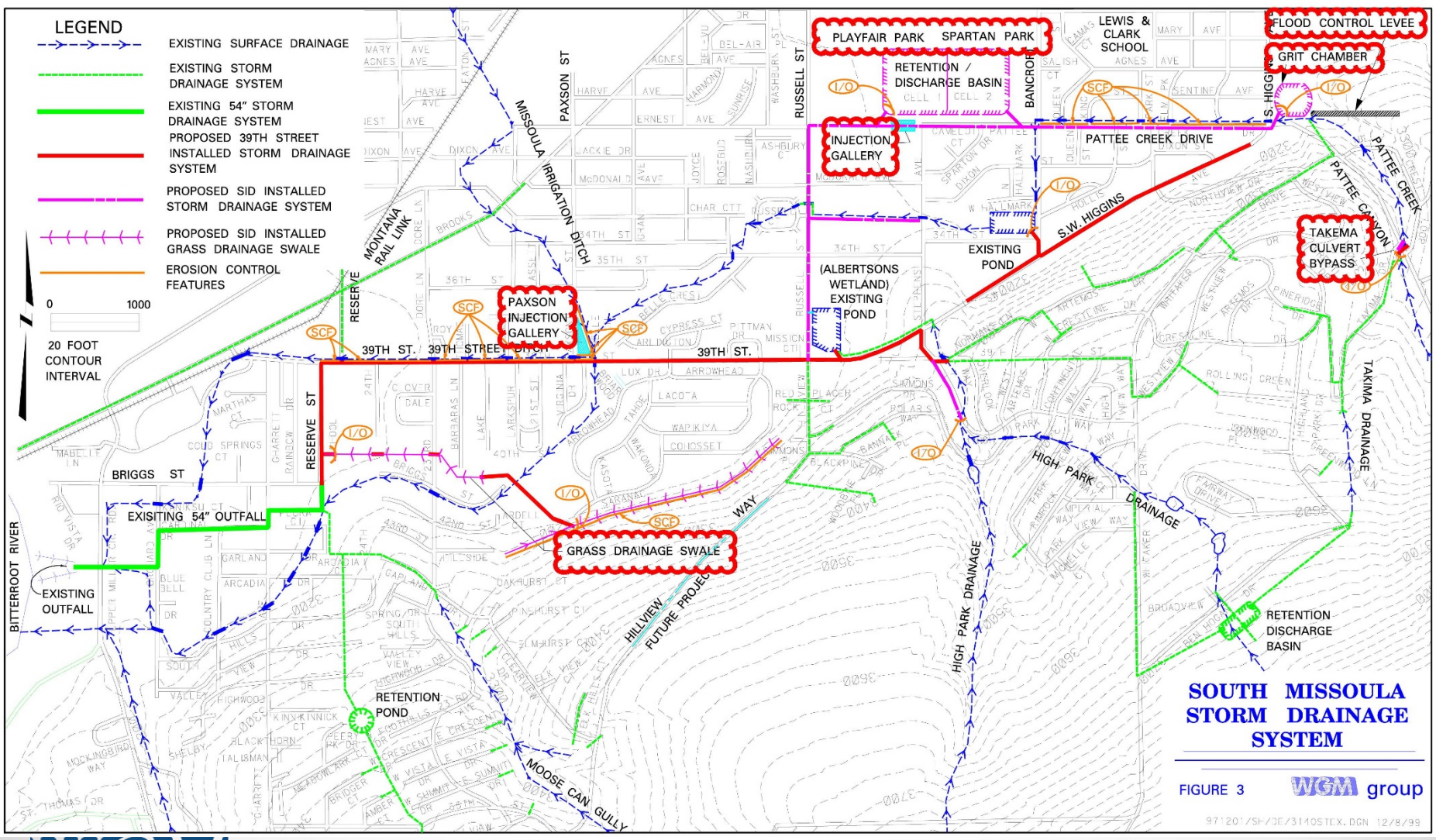
The Fix!



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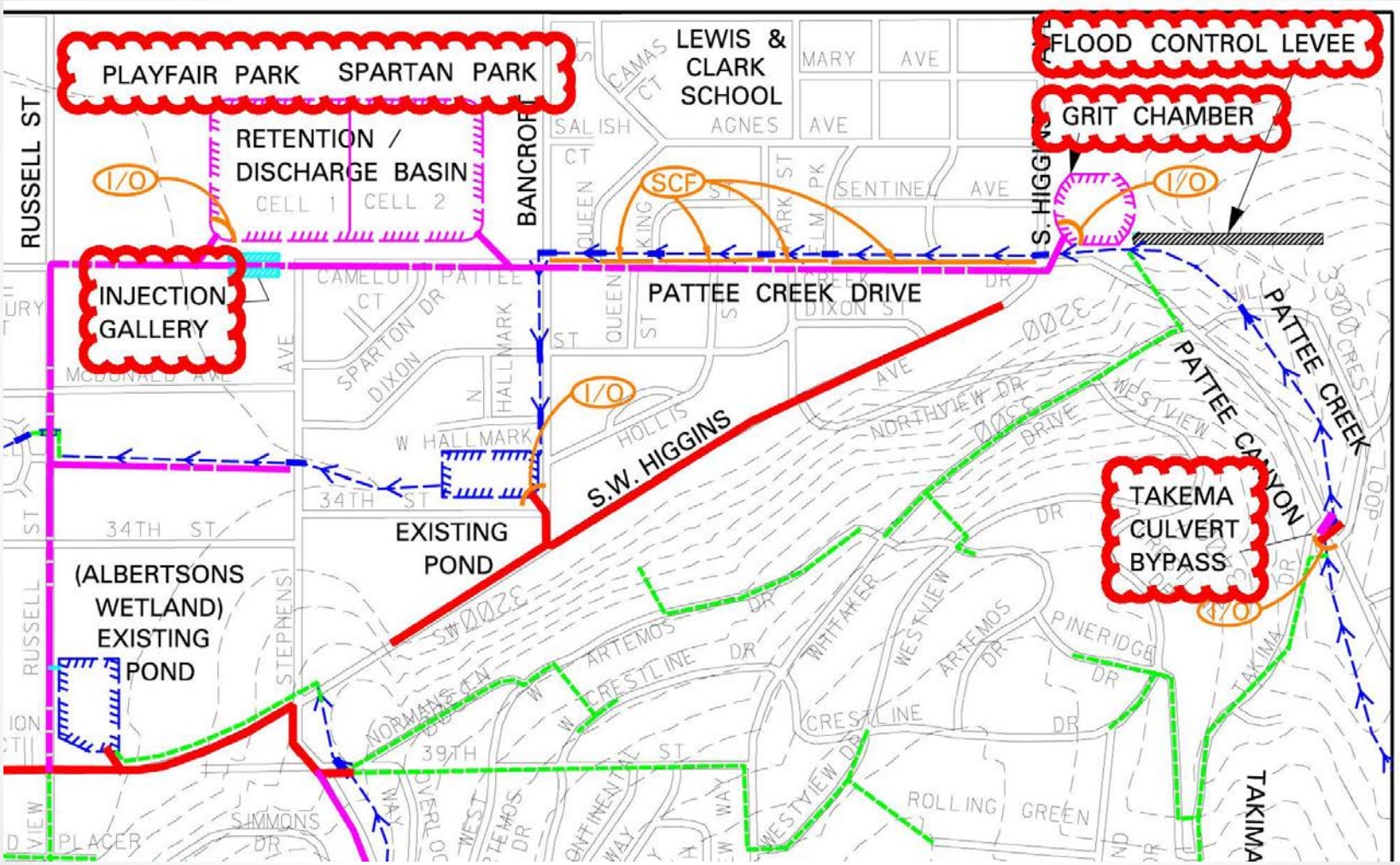
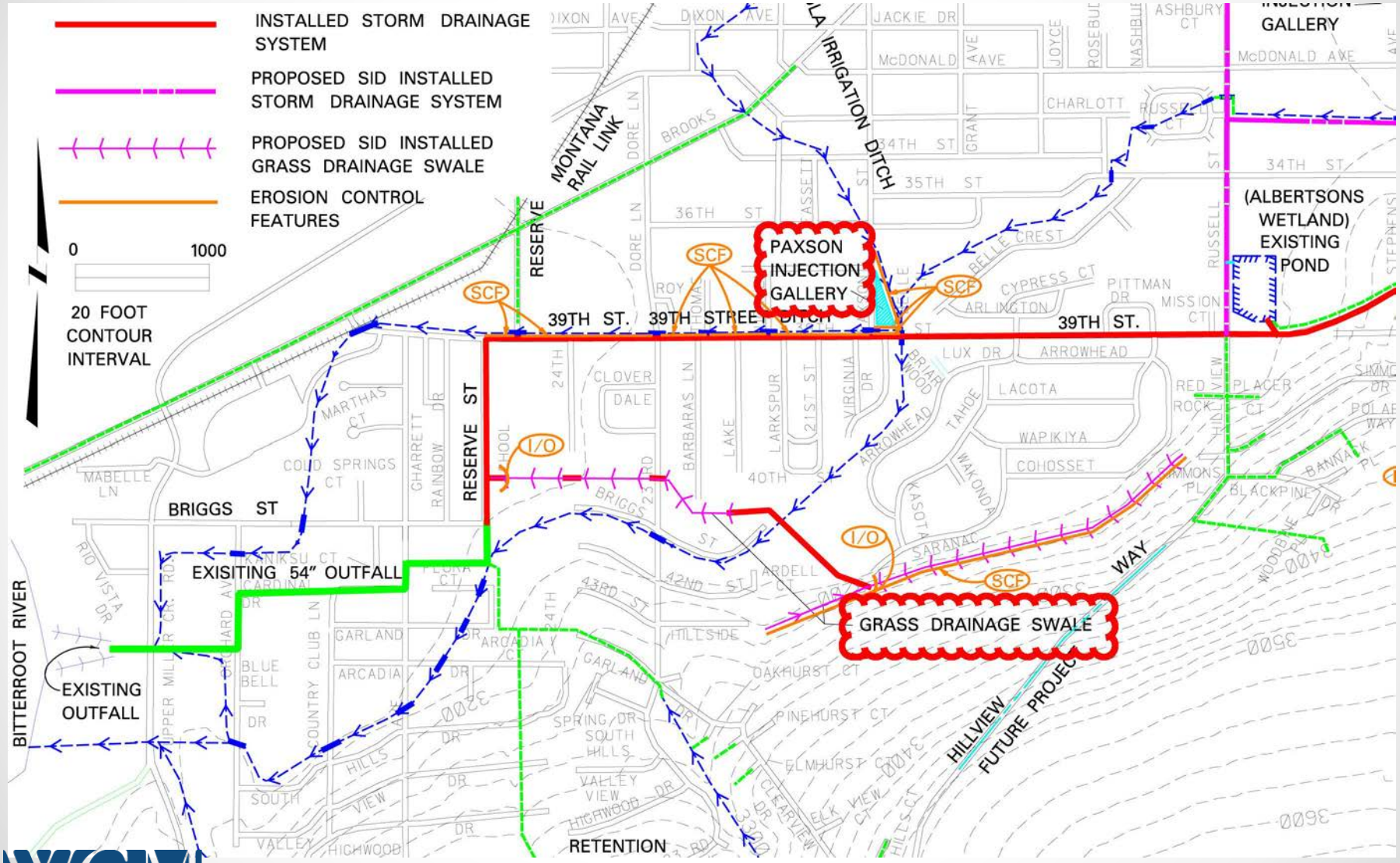
The Fix!


PLAYFAIR PARK
SPARTAN PARK
RETENTION / DISCHARGE BASIN
CELL 1
CELL 2
I/O
INJECTION GALLERY
LEWIS & CLARK SCHOOL
FLOOD CONTROL LEVEE
GRIT CHAMBER
SCF
PATTEE CREEK DRIVE
S.W. HIGGINS
EXISTING POND
(ALBERTSONS WETLAND) EXISTING POND
TAKEMA CULVERT BYPASS
PATTEE CREEK
PATTEE CANYON
RUSSELL ST
BANCROFT
34TH ST
39TH
W HALLMARK
MCDONALD AVE
SPARTAN DR
CAMELOT CT
HOLLIS
NORTHVIEW DR
WESTVIEW
ARTEMOS DR
CRESTLINE DR
WHITAKER
PINERIDGE DR
ROLLING GREEN
SIMMONS DR
PLACER
STEPHENS
NORMANDY
TAKIMA
SENTINEL AVE
MARY AVE
AGNES AVE
SALISH CT
CAMAS CT
QUEEN ST
KING ST
DIXON ST
3200
3300

The Fix!



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Geeky Stuff

- Models
  - Hydrology: Previous Studies, Regression Eqns, & HEC-HMS
  - Open Channel: HEC-RAS
  - Pipe System: MIKE-SWMM

Unique Elements: Grit Chamber

Unique Elements: Playfair Park Storage

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Unique Elements: Playfair Overflow

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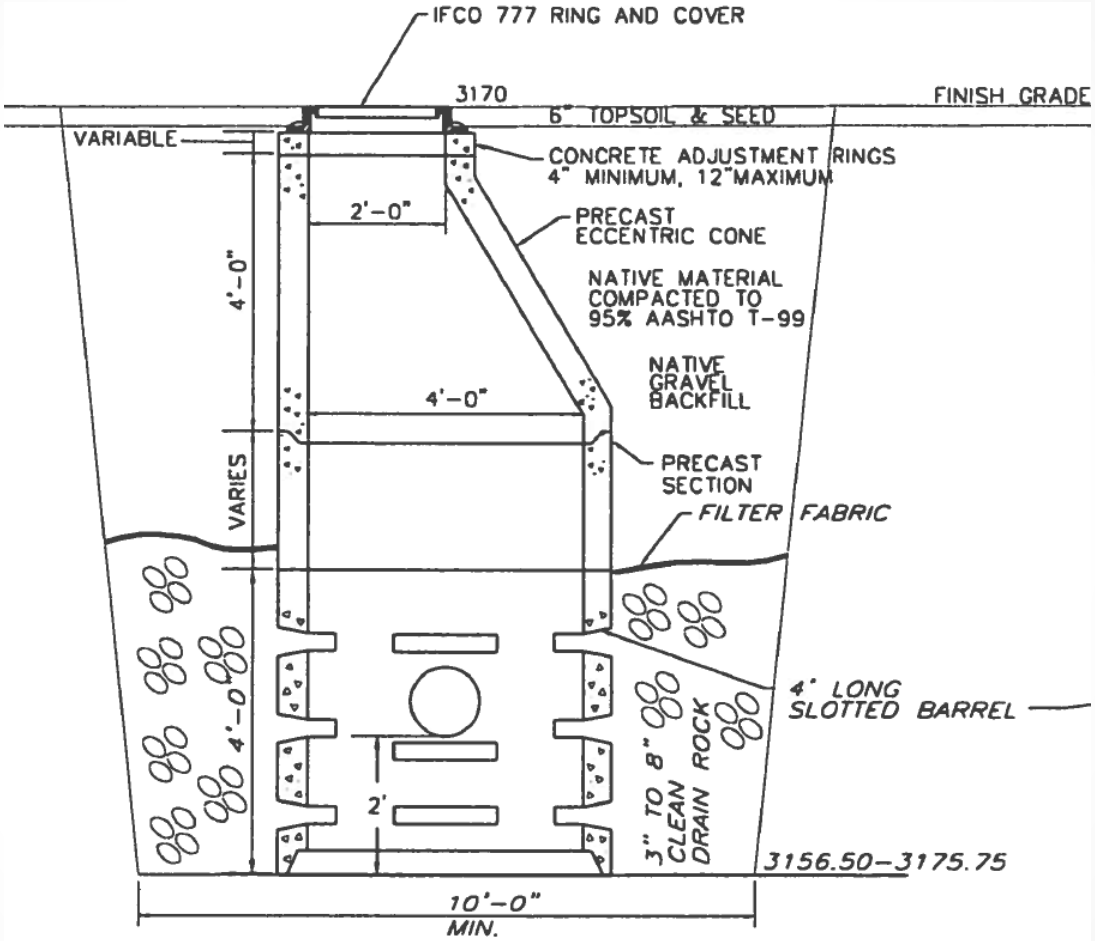
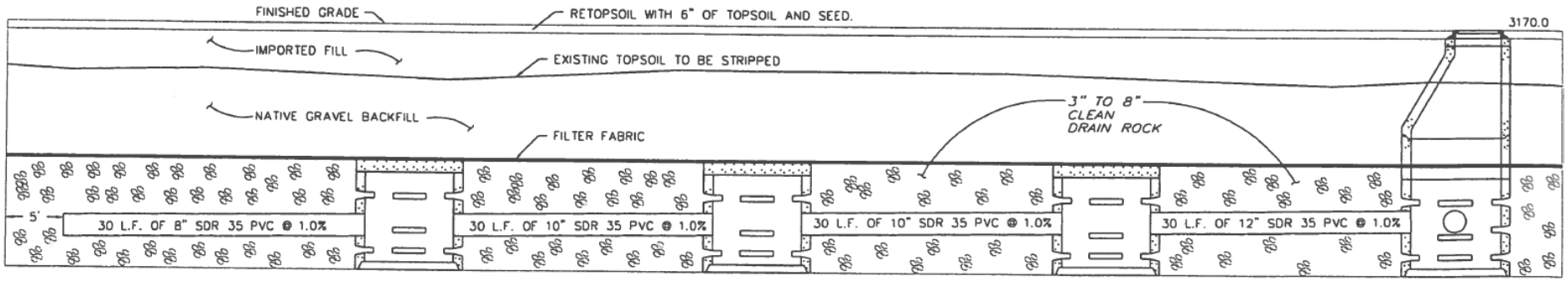
Unique Elements: Infiltration



SUMP DETAIL

NO SCALE

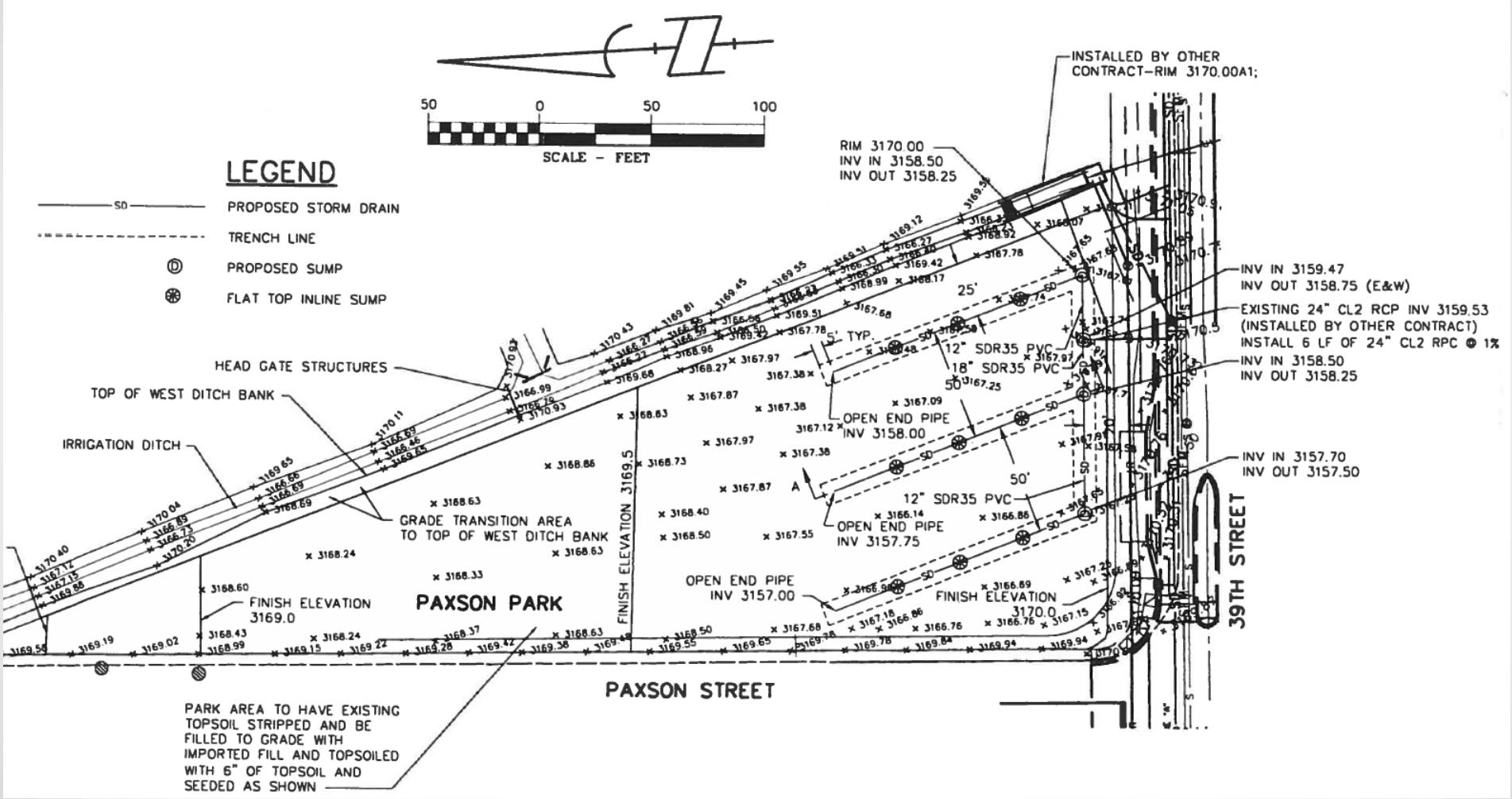
Unique Elements: The Super Sump!!



SECTION A–A

NO SCALE

Unique Elements: The Super Sump!!



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Unique Elements: The Super Sump!!

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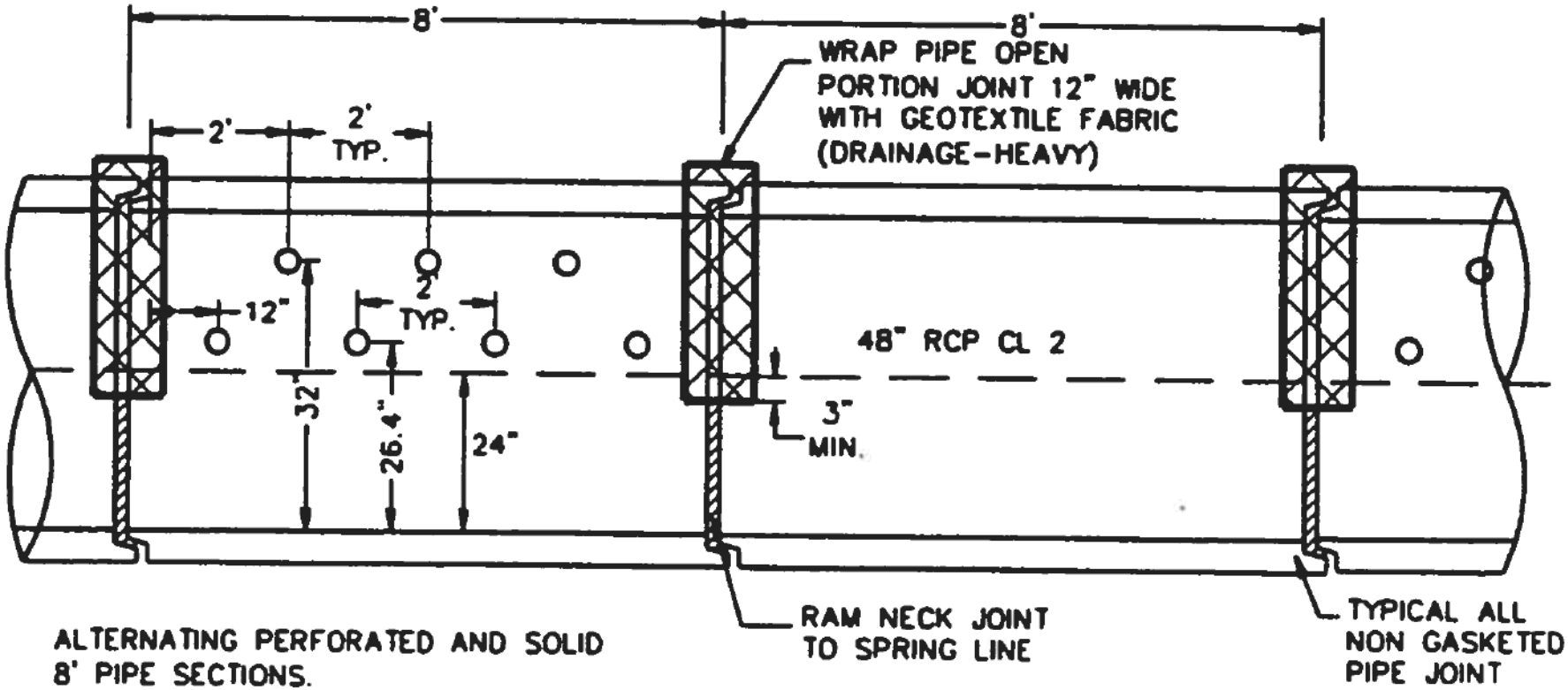
Unique Elements: The "Leaky" Pipe

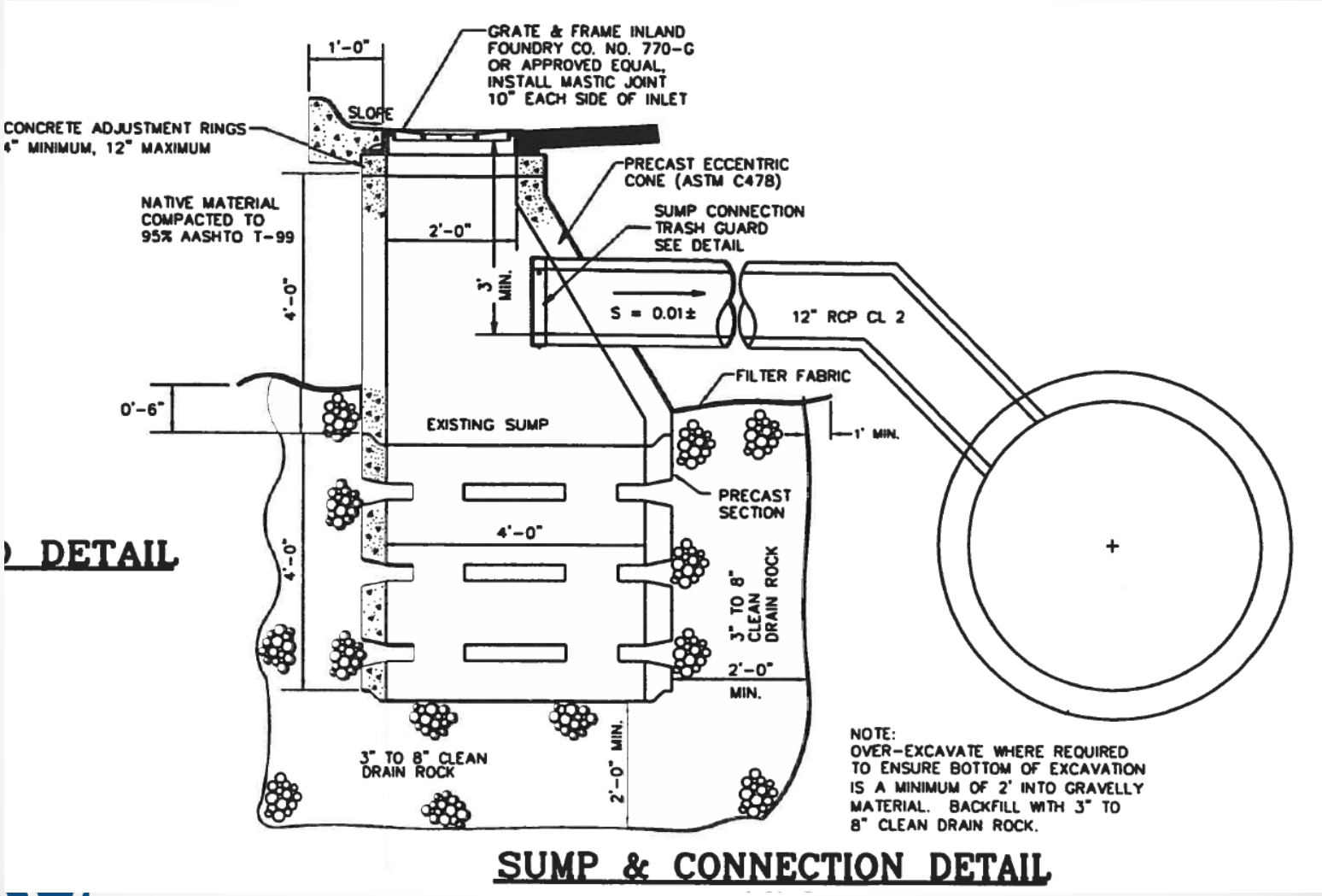


STA 34+00 TO STA 38+50

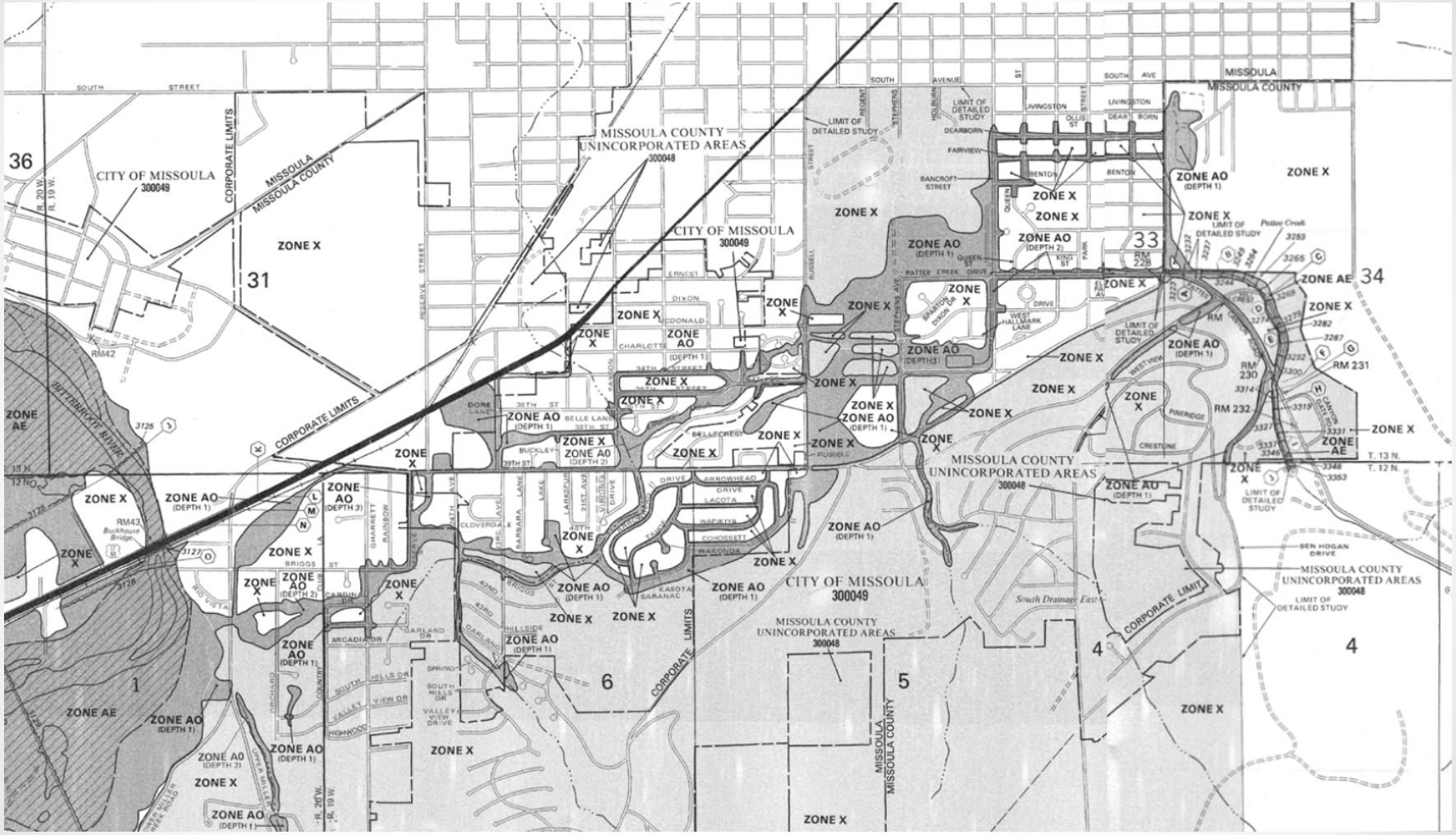
INJECTION BASIN PIPE DETAIL

NO SCALE

Unique Elements: The "CYA" Sump



1988 FIRM



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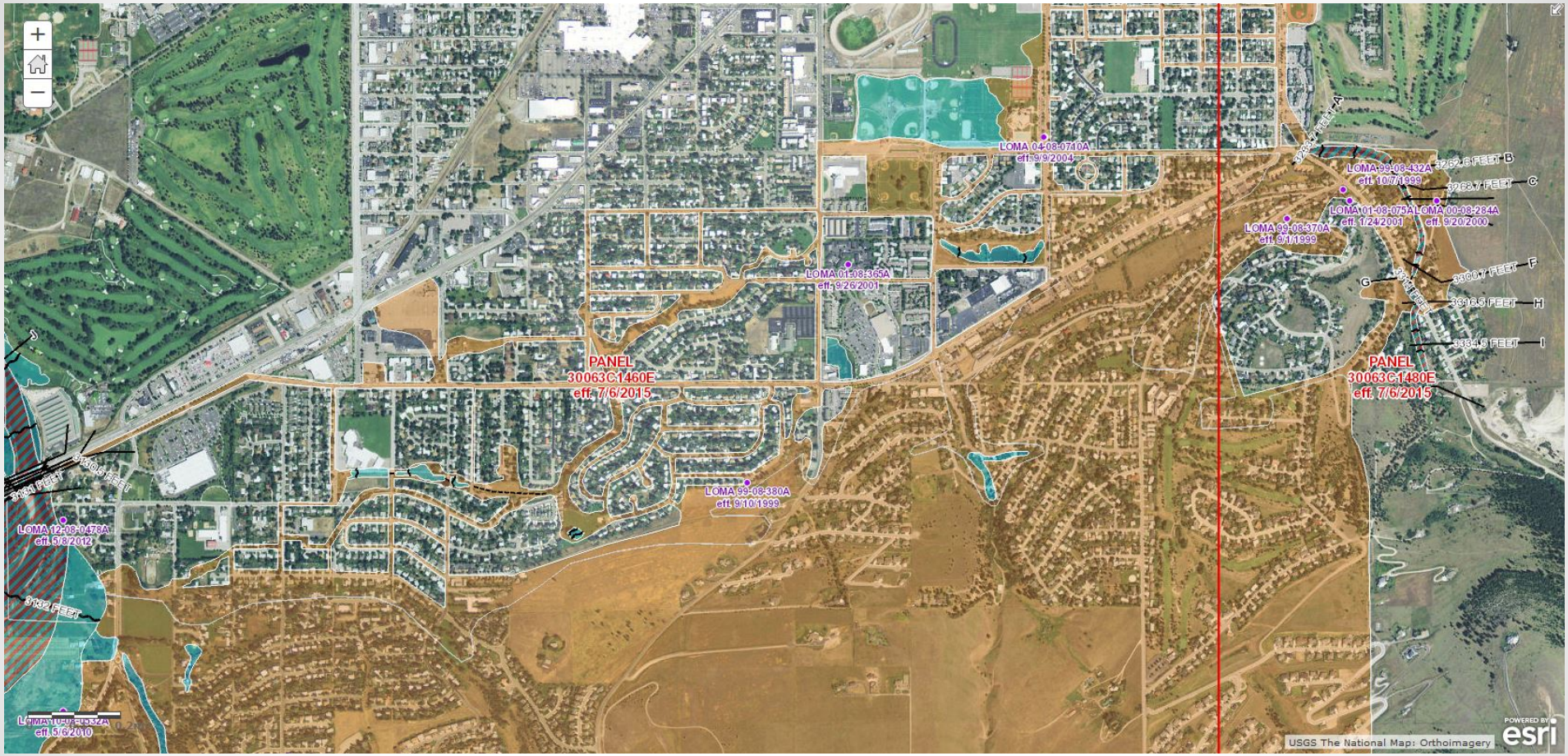
2014 FIRM



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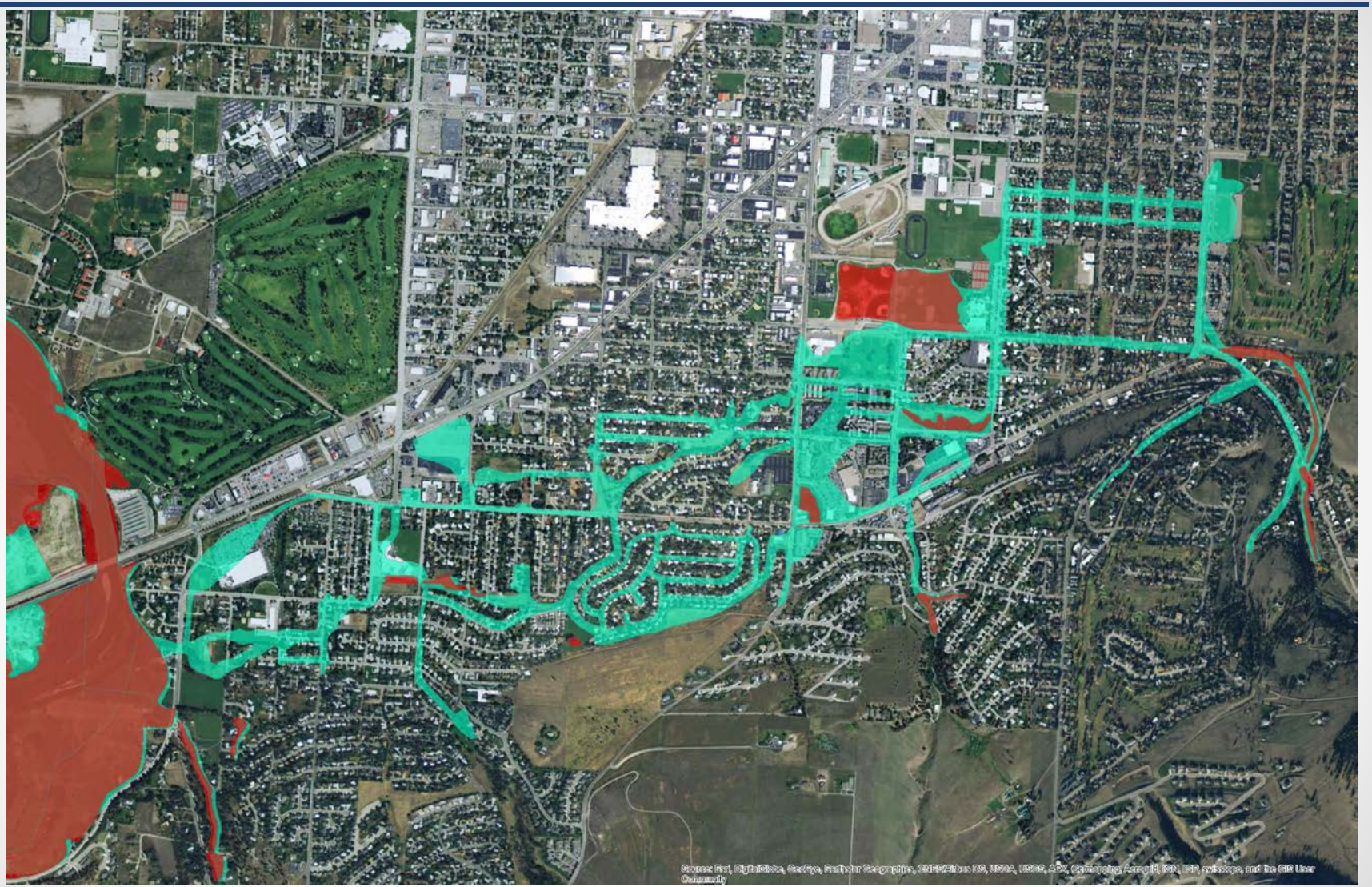
1988 FIRM vs. LOMR



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Summary

- Community Based Solution
- Funding Miracle
- Watershed Approach
- Conveyance, Storage, & Infiltration
- Multi-Functional Design

Questions

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