Revised NW Inner City Study: Sunnyside Review

Community Drainage Improvements

June 24, 2015

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Brad Larson, P. Eng.

THE CITY OF CALGARY
WATER RESOURCES

Today's Information

- Design Condition 1
  - Rainfall drainage when the river is low
- Design Condition 2
  - Rainfall drainage when the river is high
- Excluded for today
  - Riverbank restoration
  - Basin controls (dams)
  - River engineering studies
  - Sanitary lift station resiliency

Most Stormwater Components

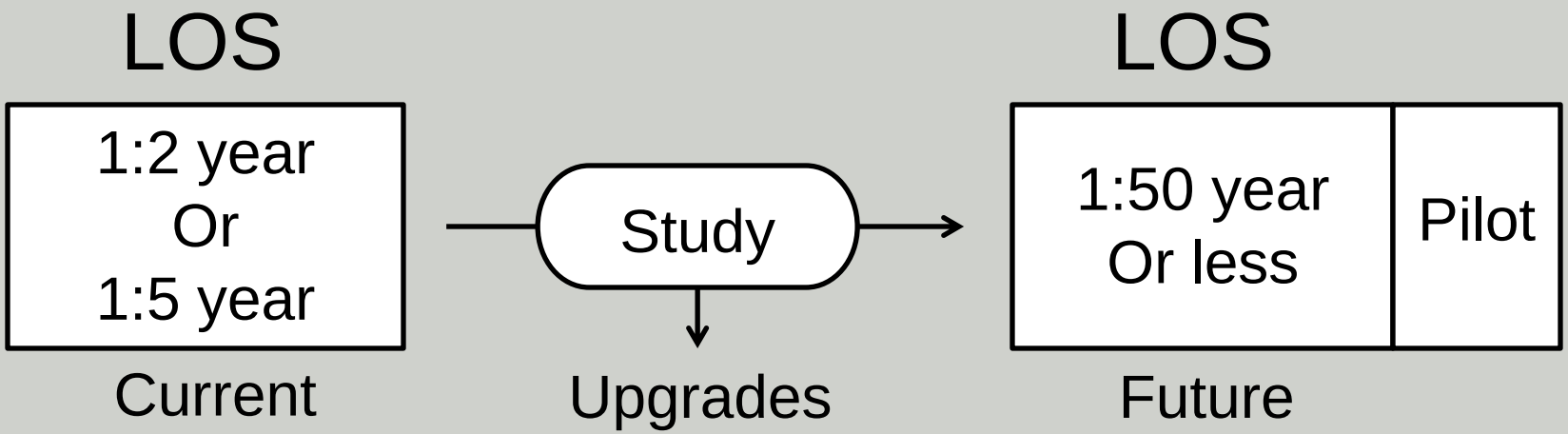
- Pipes, Manholes, Catchbasins

What Is Considered

- Previous recommendations
- NEW Conveyance upgrades for Sunnyside
- NEW Upper plateau diversion
- NEW Pumping infrastructure during gate closure
- Community Drainage Improvement (CDI) Prioritization List

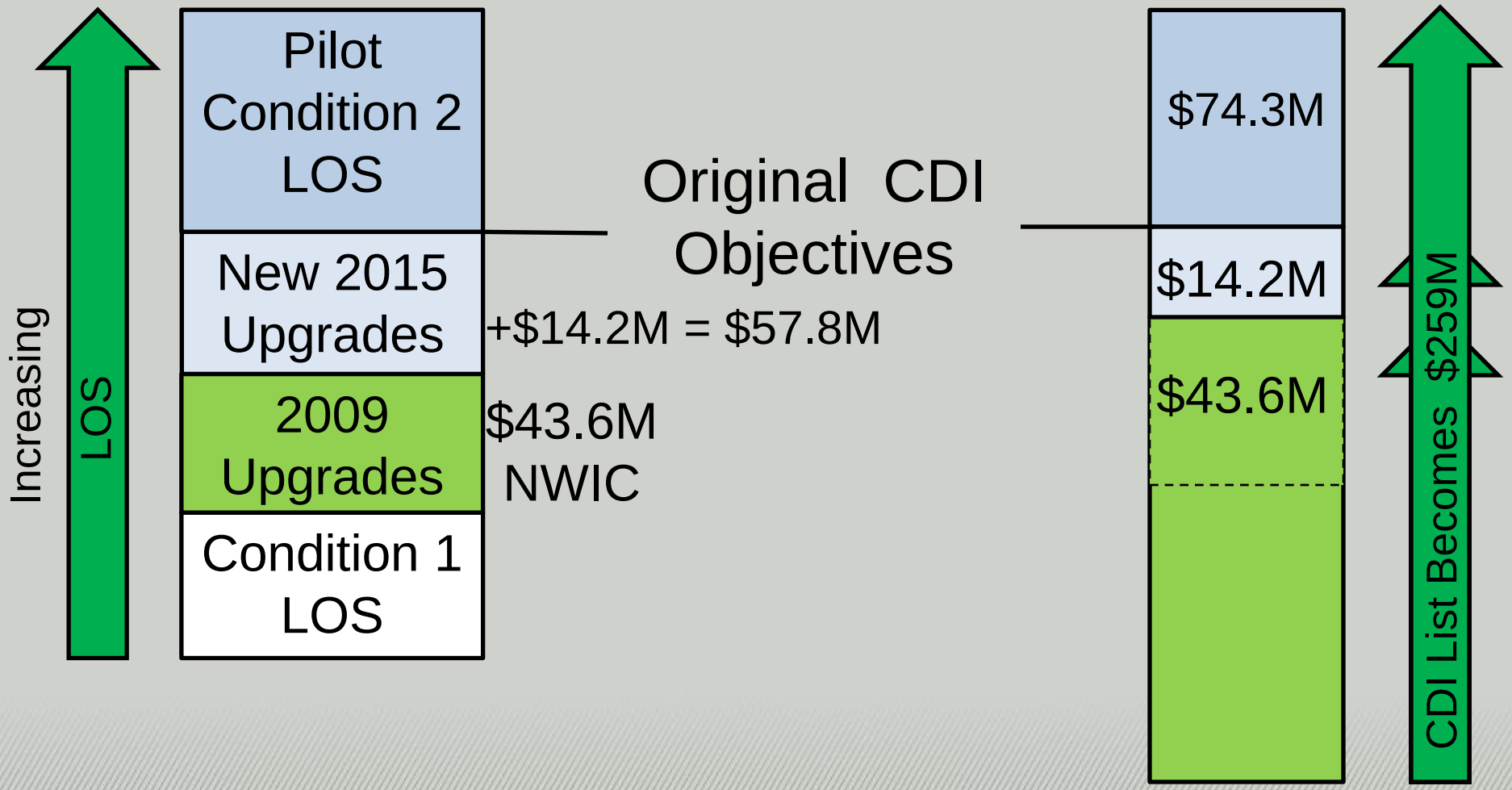
Community Drainage Improvement (CDI) Program

Design Condition 1

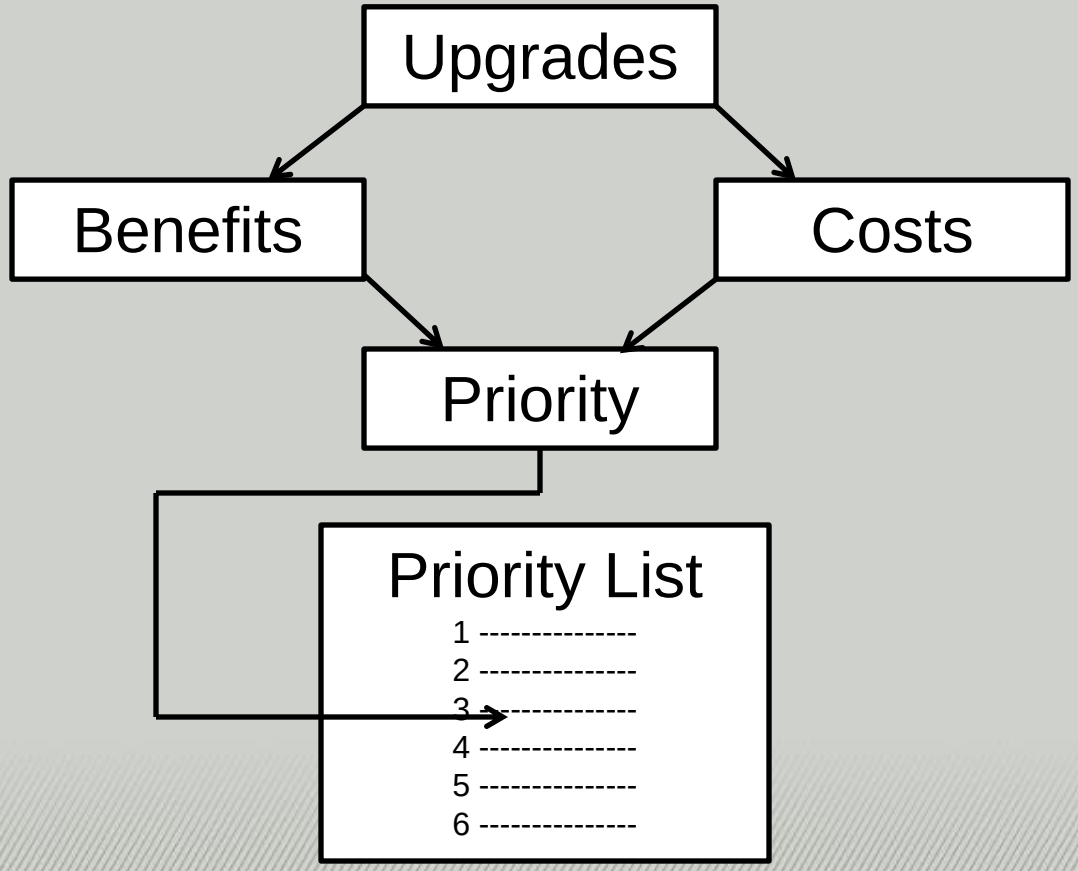


LOS = Level of Service

CDI Upgrade Costs



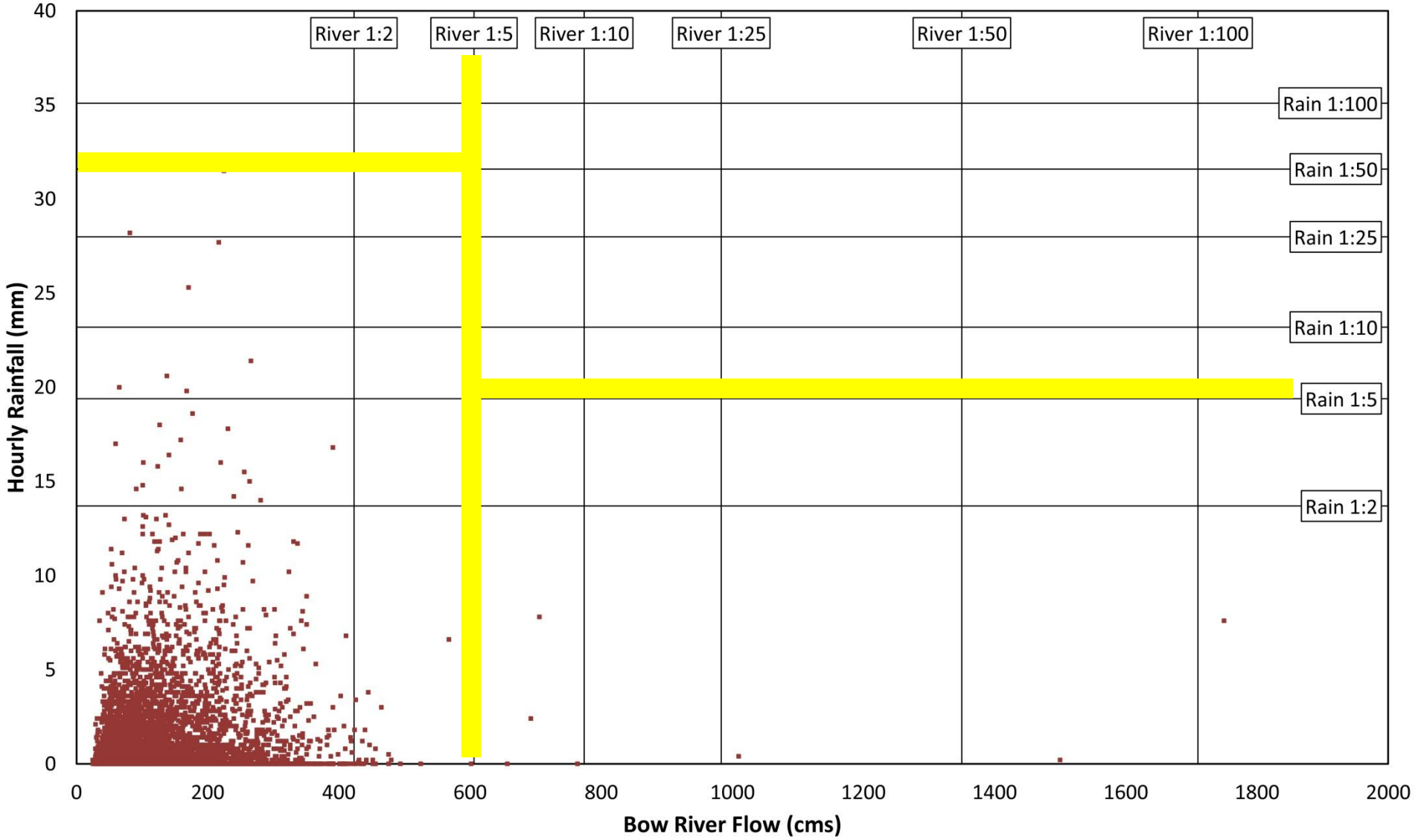
Community Drainage Improvement (CDI) Program



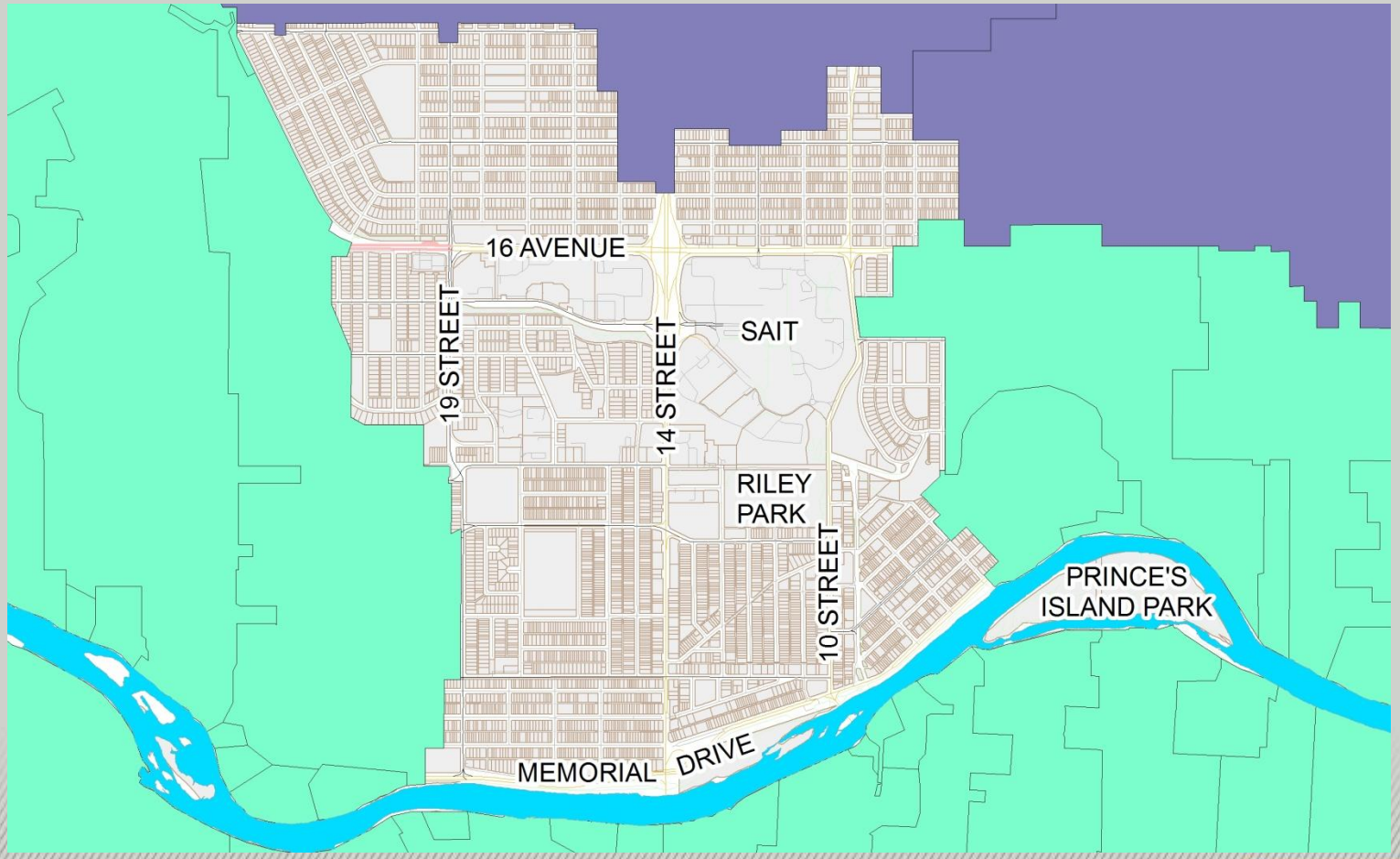
Historical Analysis

- Purpose
  - Determine Condition 2 rainfall design Level of Service
- Rain Gauge Records, River Records
- Graphing: Concurrent Events
  - Plot all rainfall events & review against river levels (flow rates) that same day
  - 7200+ comparisons over 55 years

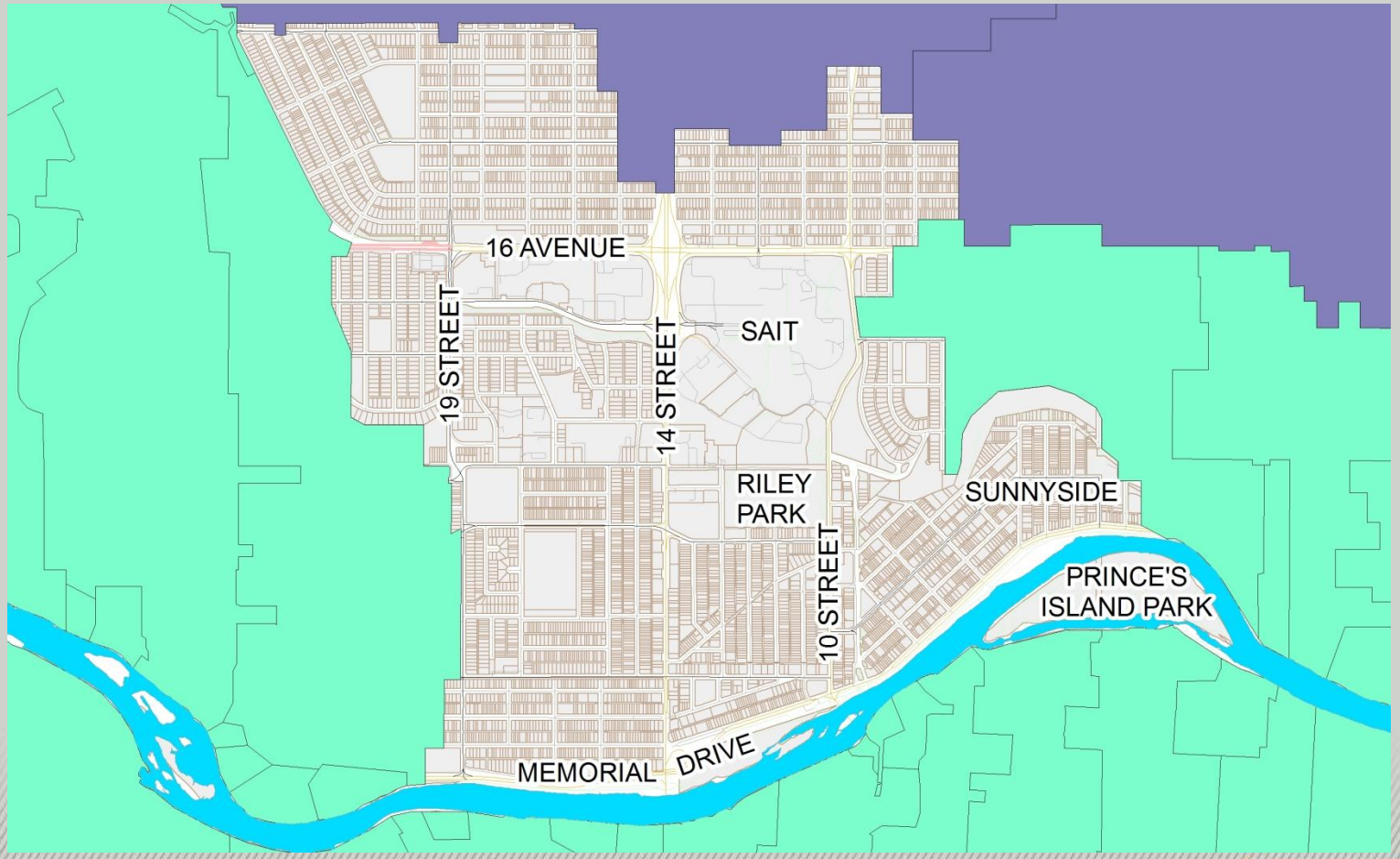
Maximum Hourly Rainfall by Day vs Bow River Flows



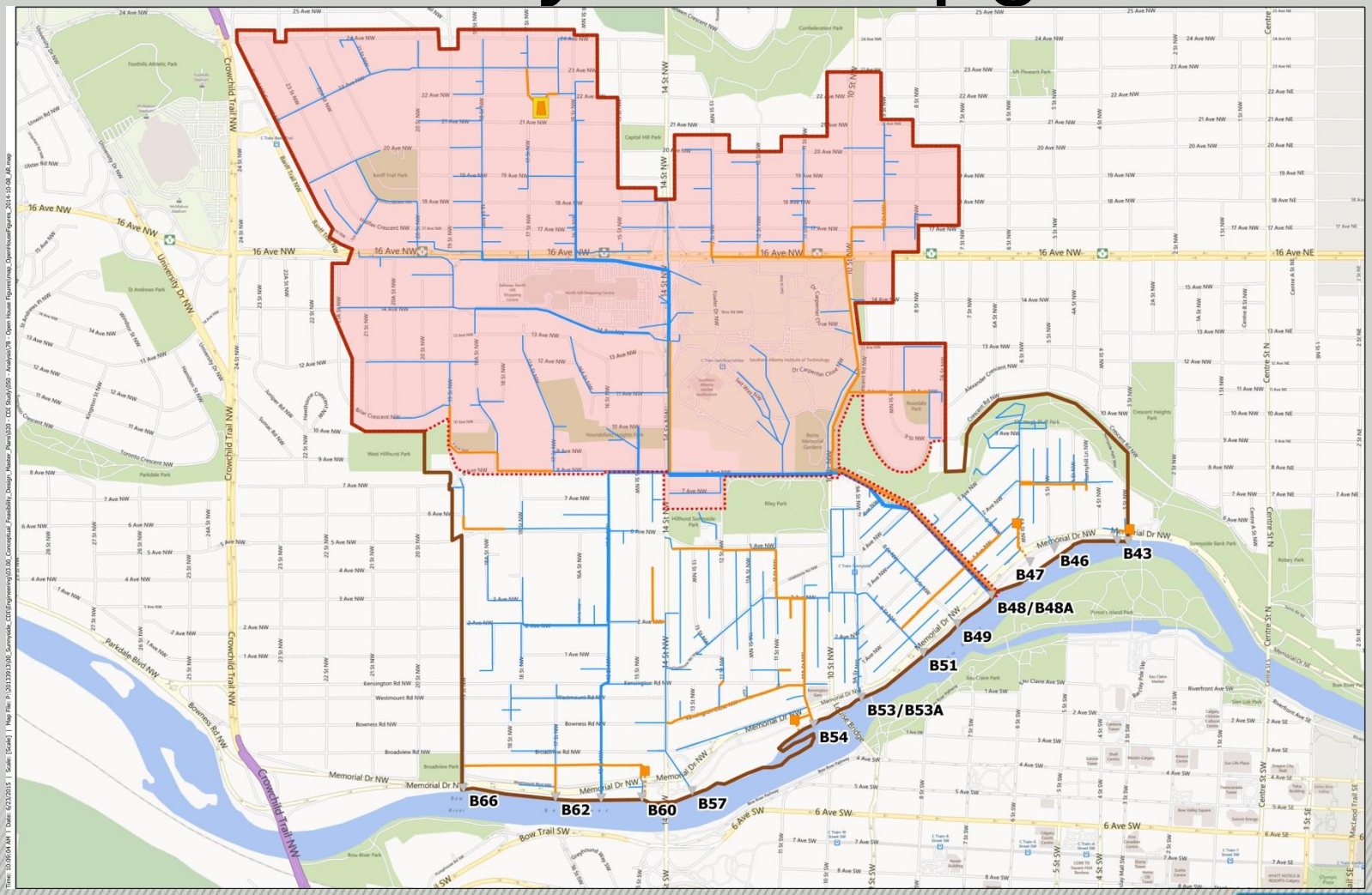
2009 CDI Study



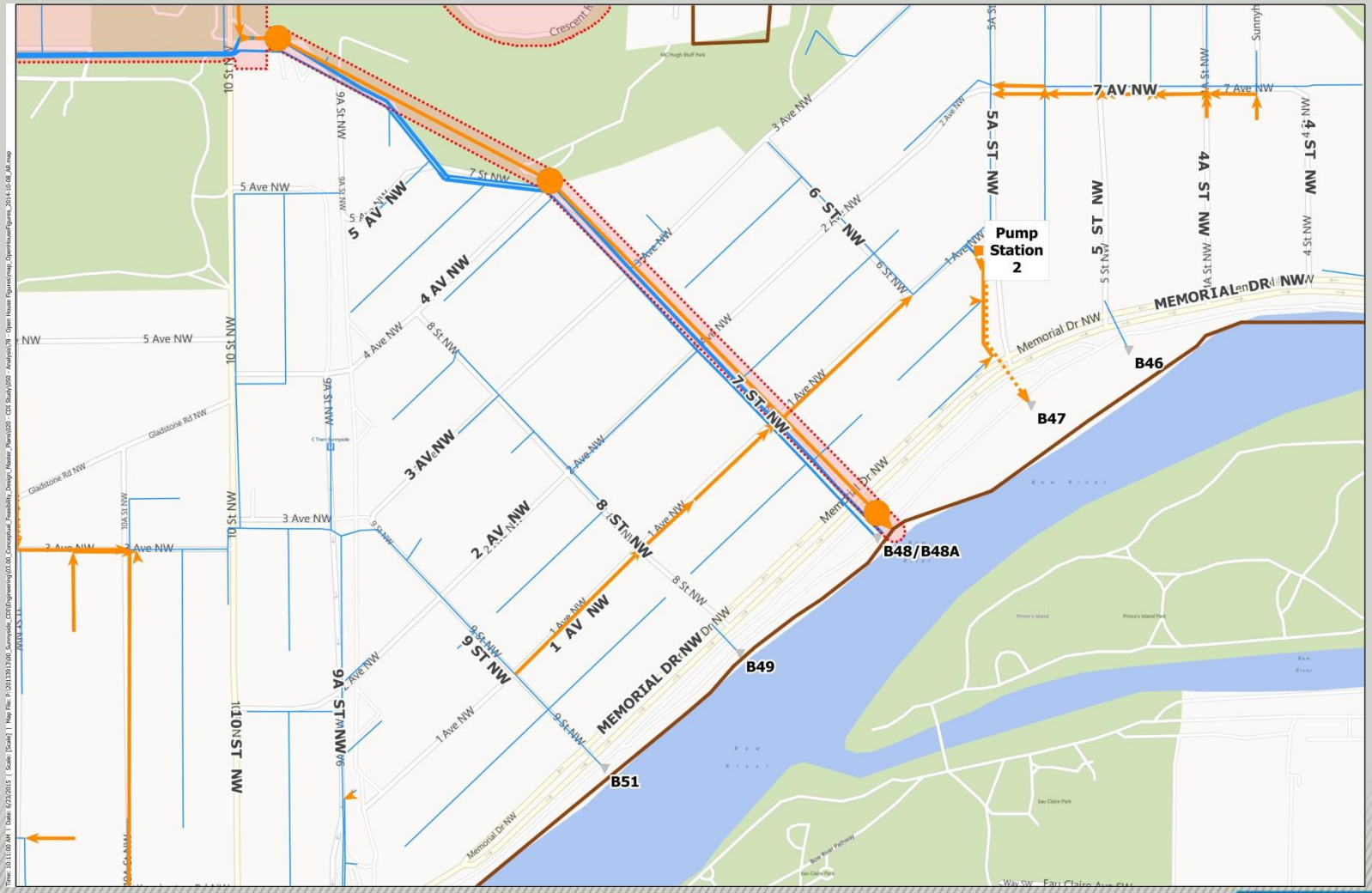
2015 CDI Study



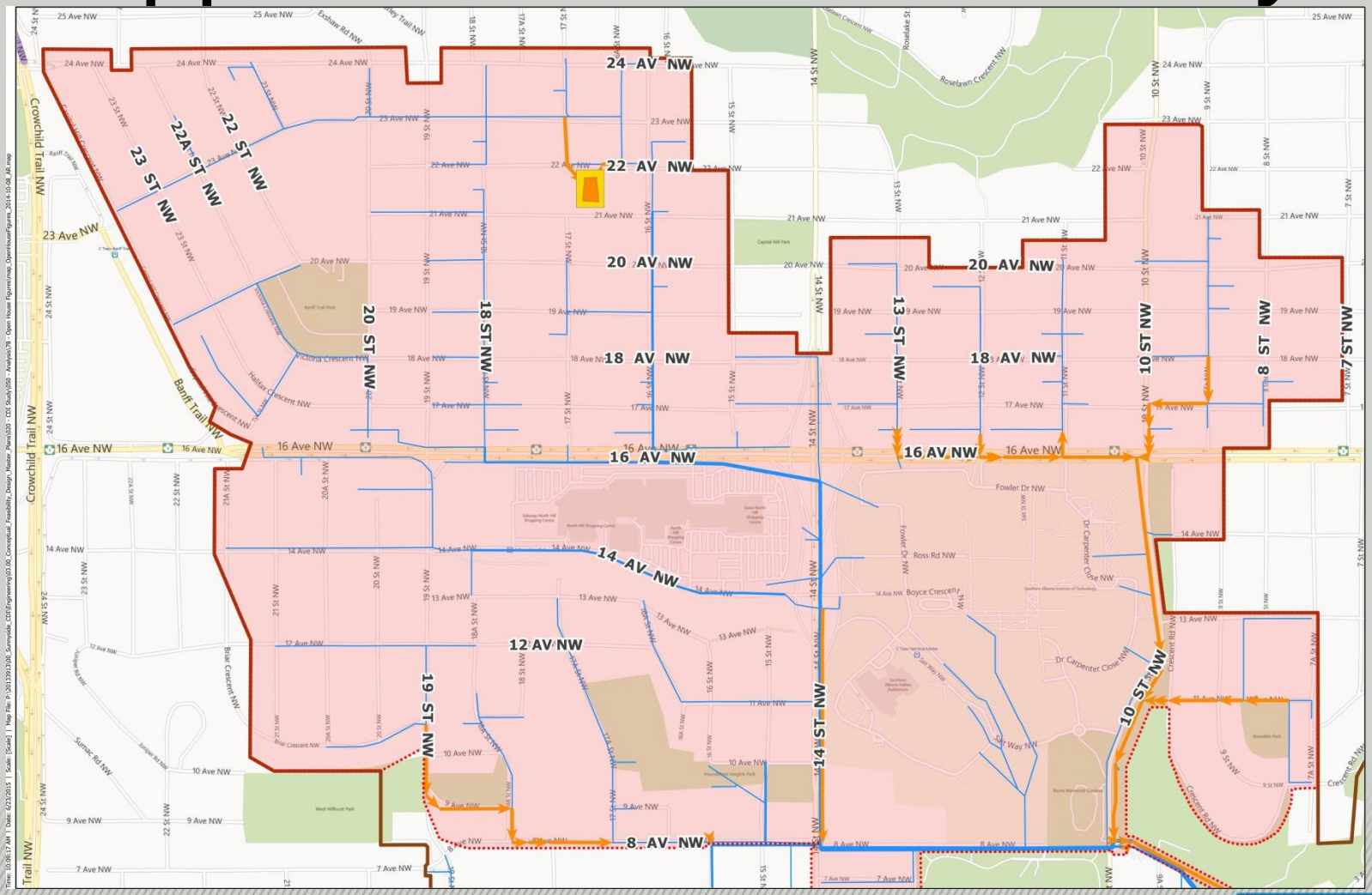
2015 Study Area Upgrades



Large 7th Street Trunks



Upper Plateau – B48B Only



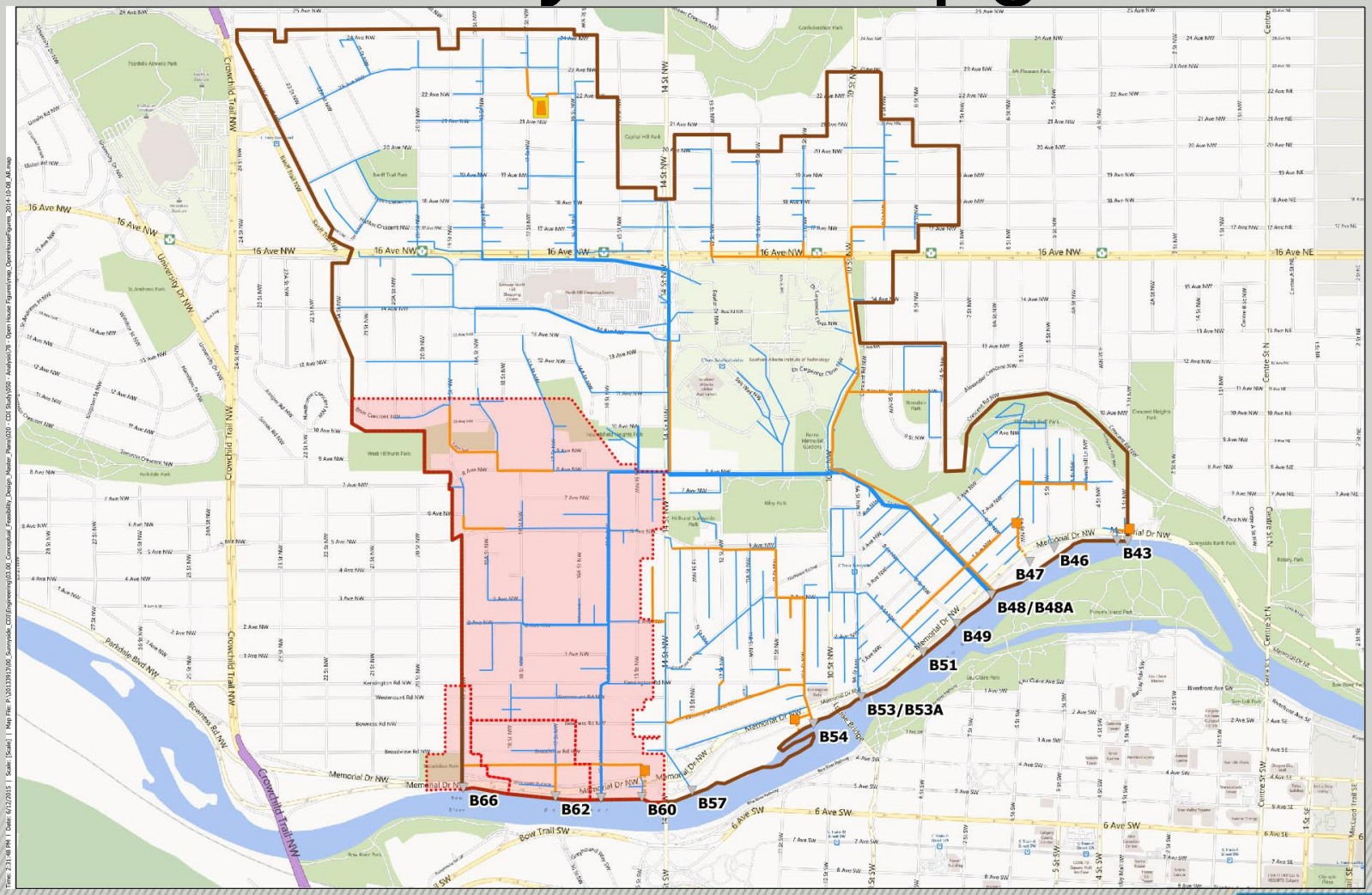
Large 7th Street Trunks (B48/B48A/B48B System)

- Upper Plateau Upgrades
  - Storage and pipe upgrades
  - New B48B Forcemain direct to the Bow
    - 6 meters deep
- Lower Plateau Upgrades
  - Separated & re-purposed B48/48A Trunks
    - Includes underground storage
  - New pipes & Pump Stations

Lower Plateau Upgrades

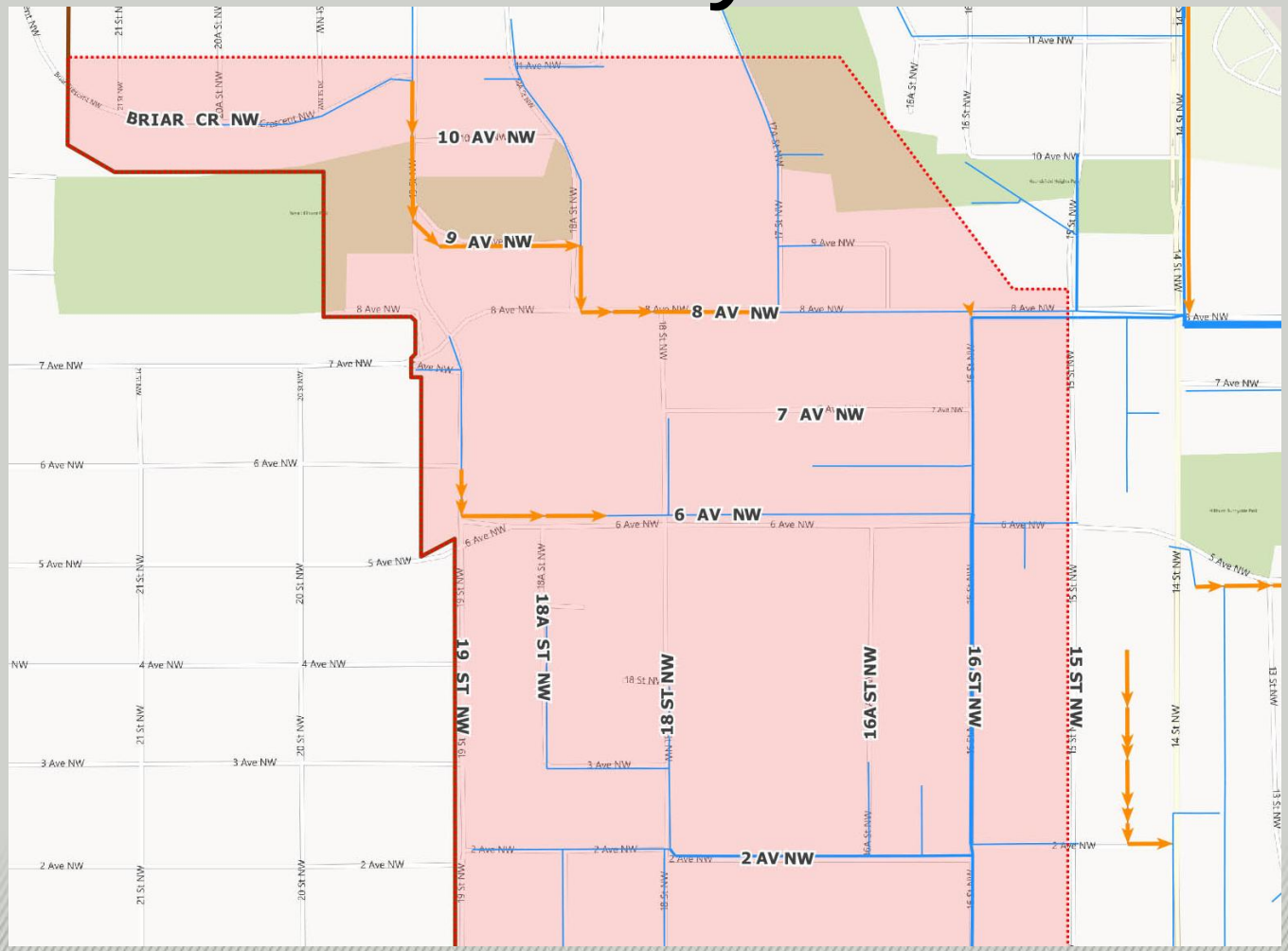
- All catchment areas will retain outfall gates
- Condition 1: Low river, gates open
- Condition 2: High River, gates closed
  - Flexible for all river levels and any future berm heights.

2015 Study Area Upgrades



Hillhurst Systems

B60
B61
B62
B66



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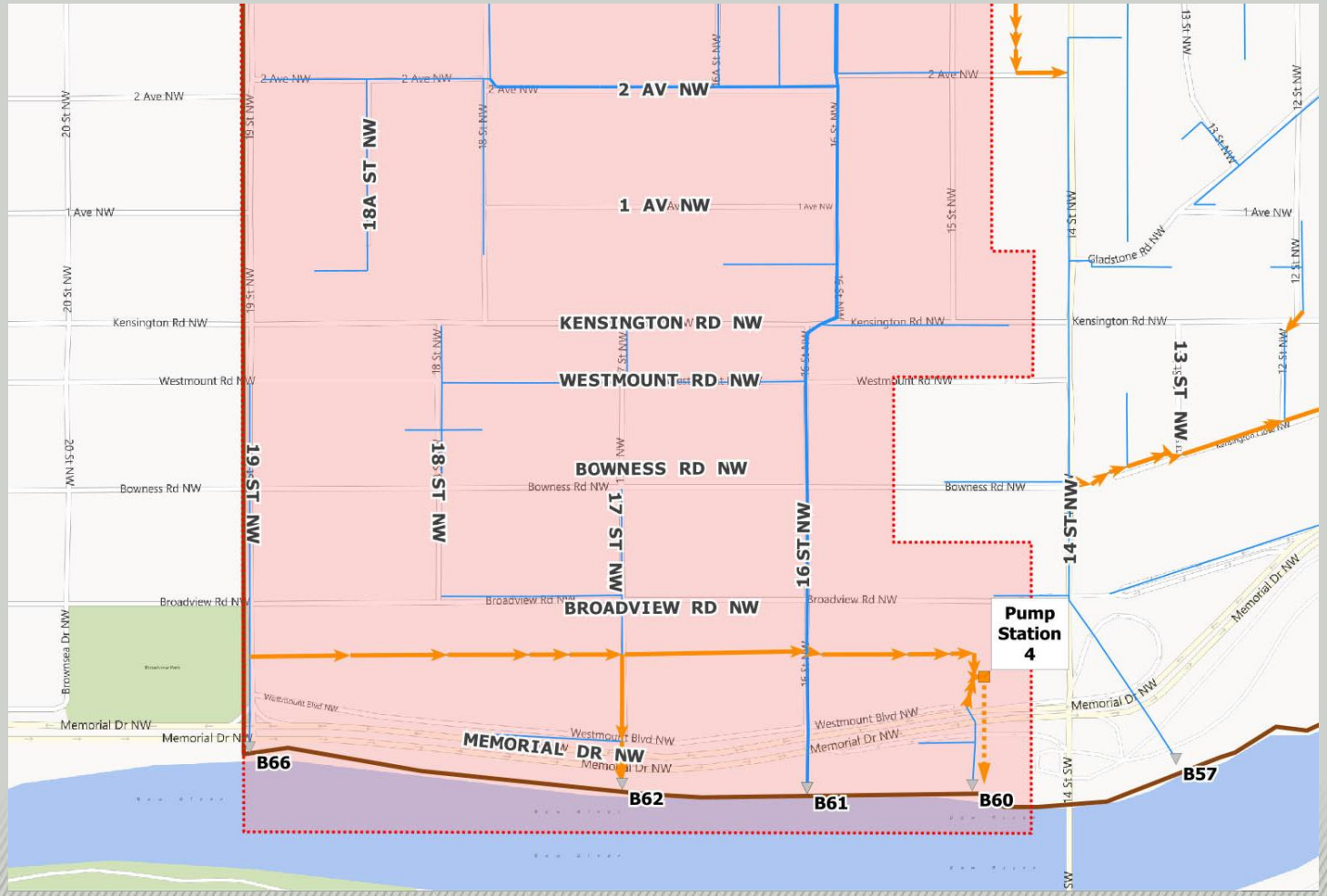

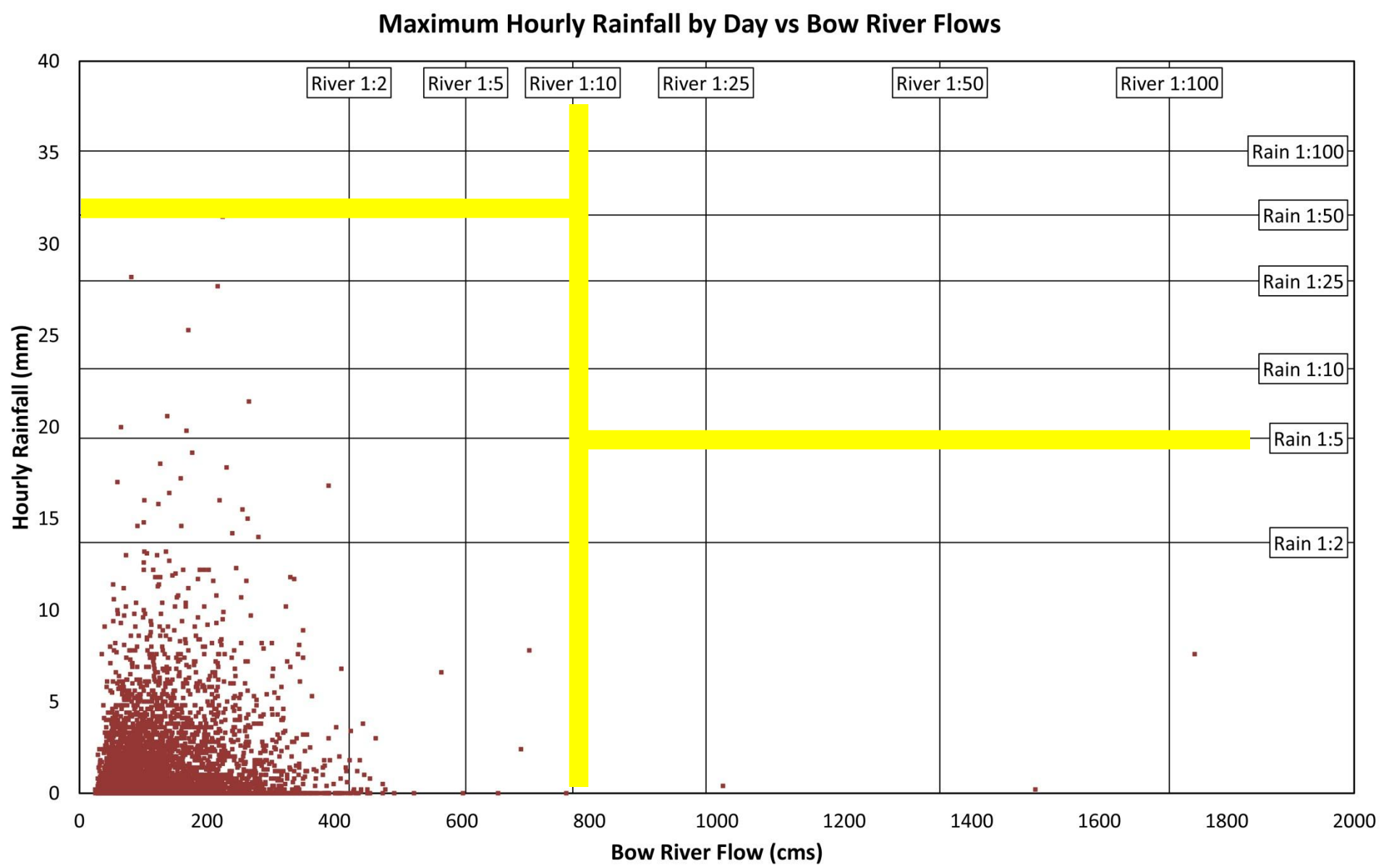
Maximum Hourly Rainfall by Day vs Bow River Flows
River 1:2
River 1:5
River 1:10
River 1:25
River 1:50
River 1:100
Rain 1:100
Rain 1:50
Rain 1:25
Rain 1:10
Rain 1:5
Rain 1:2
Hourly Rainfall (mm)
0
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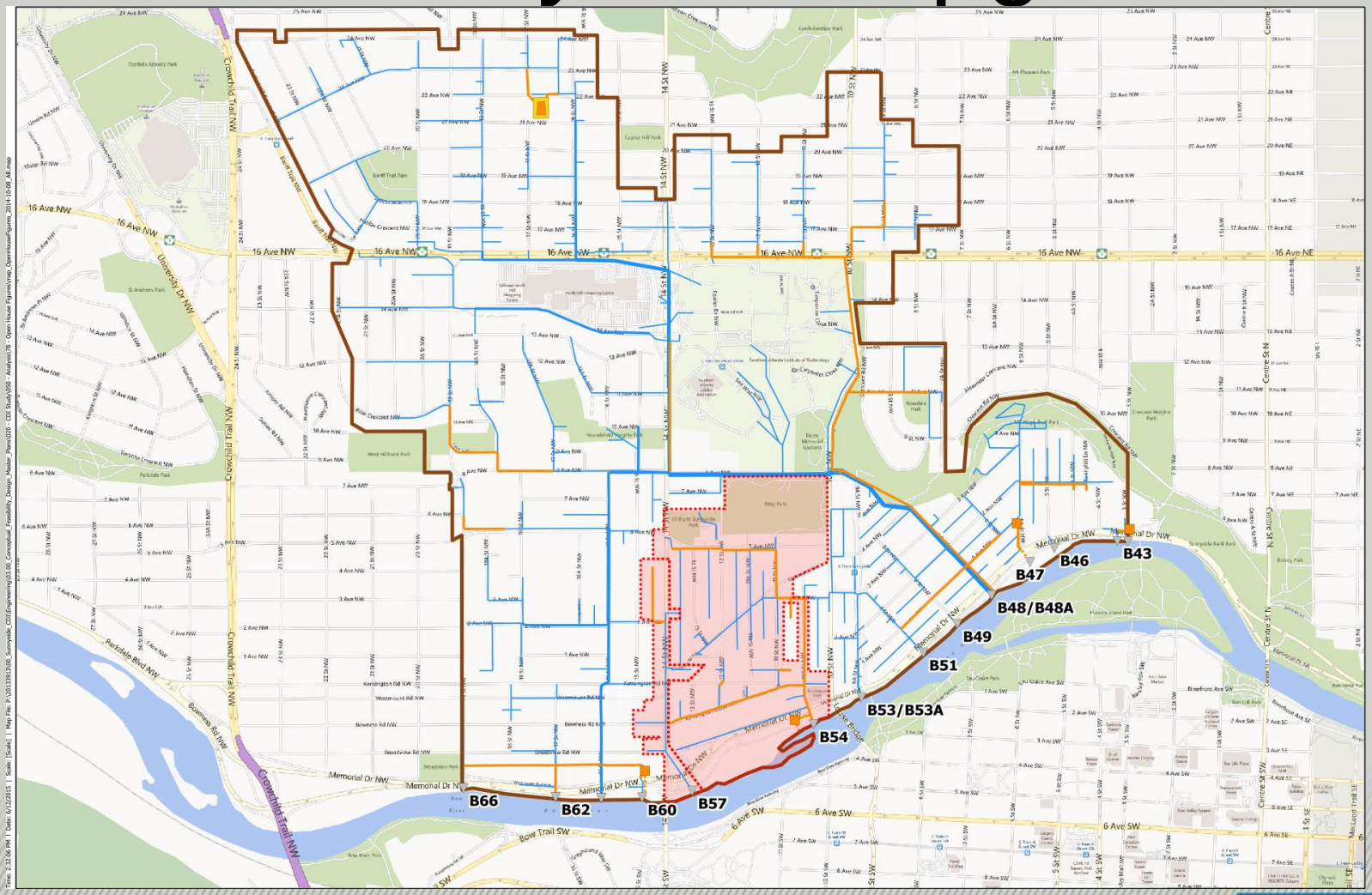
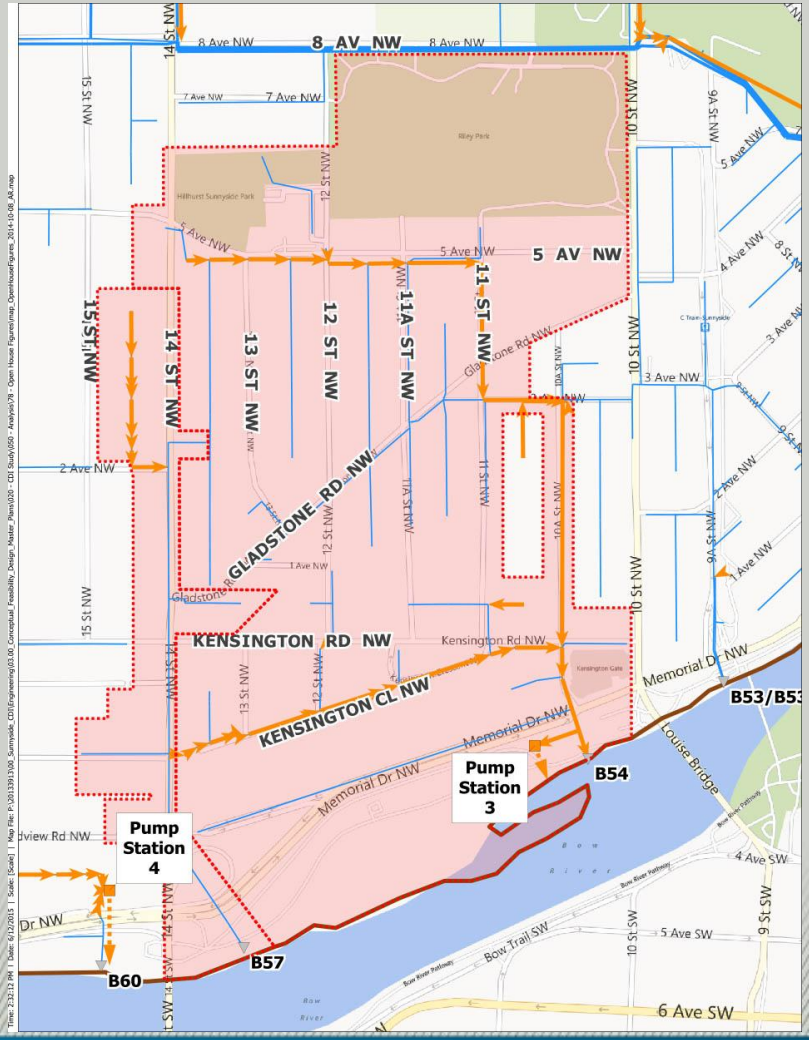
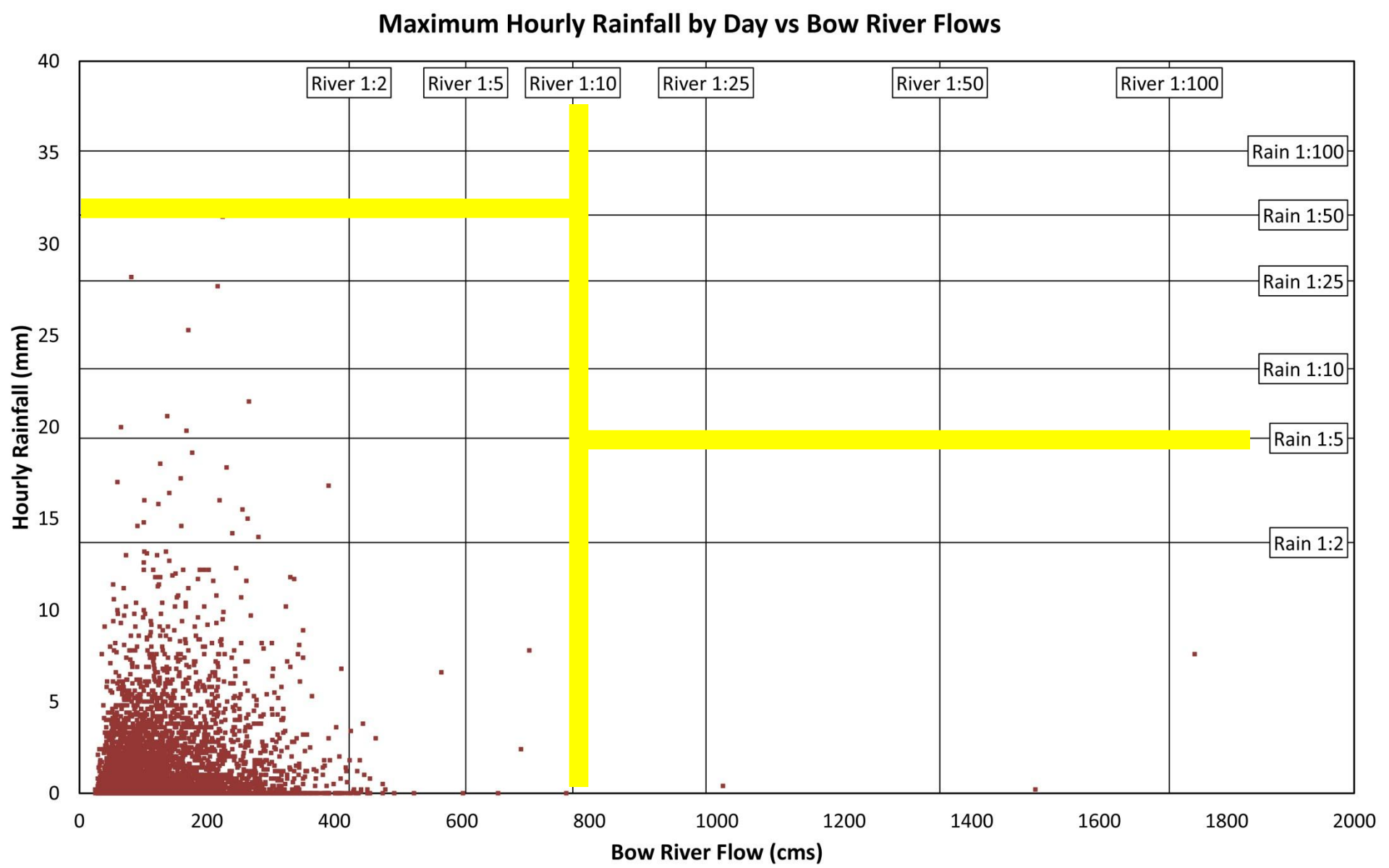
1200
1400
1600
1800
2000
Bow River Flow (cms)

2015 Study Area Upgrades



Hillhurst Systems: B54 & B57

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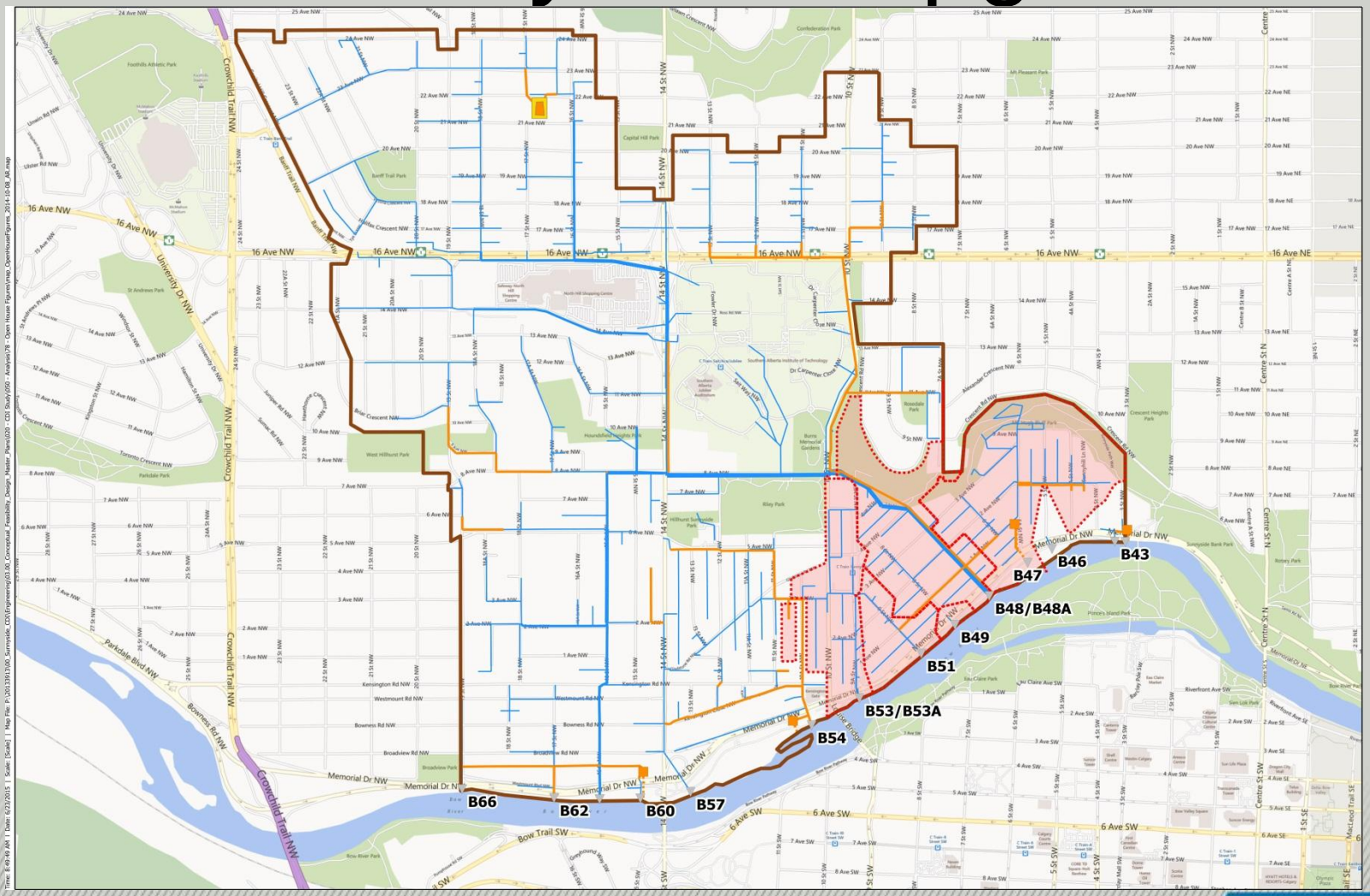
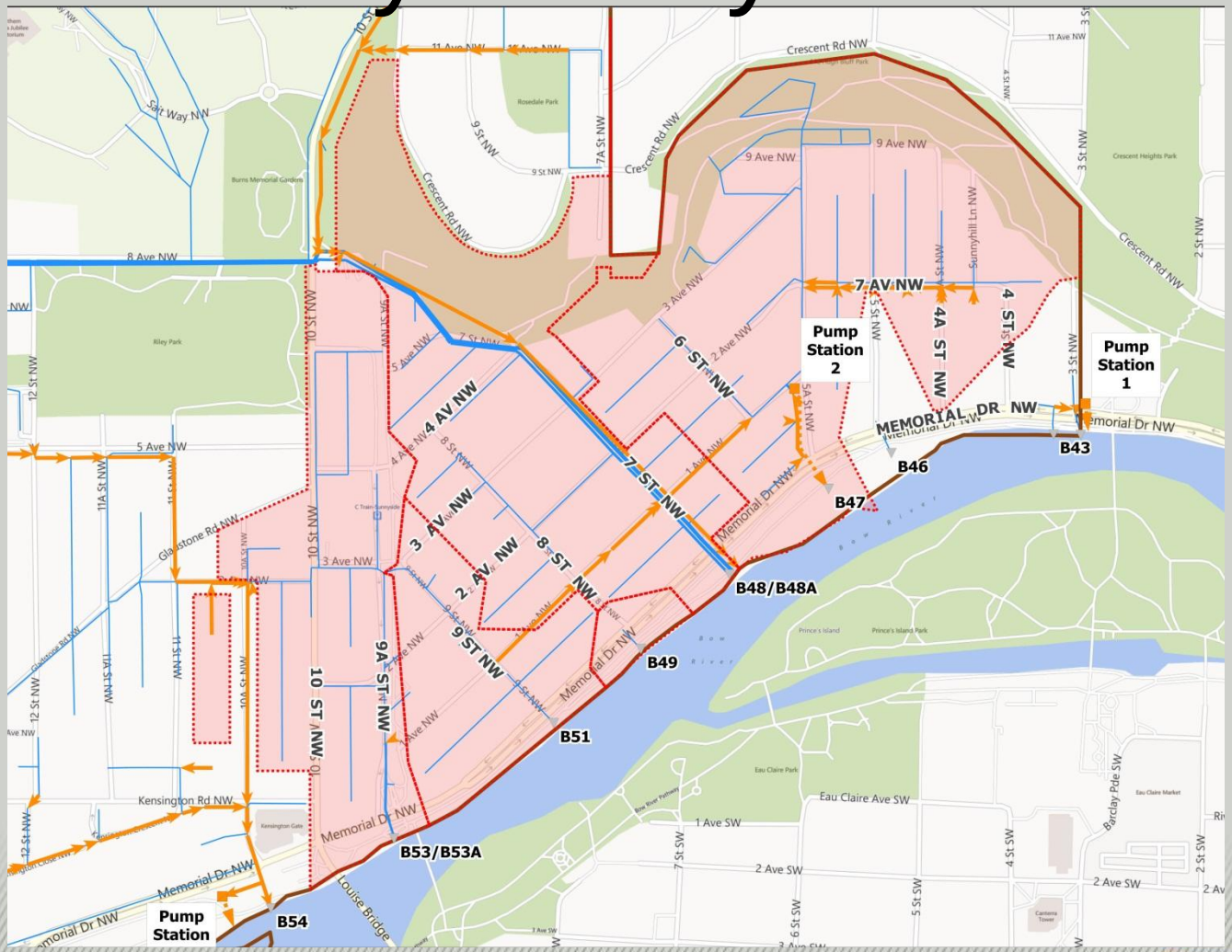


Sunnyside System

B47
B48
B48A
B49
B51
B53
B53A



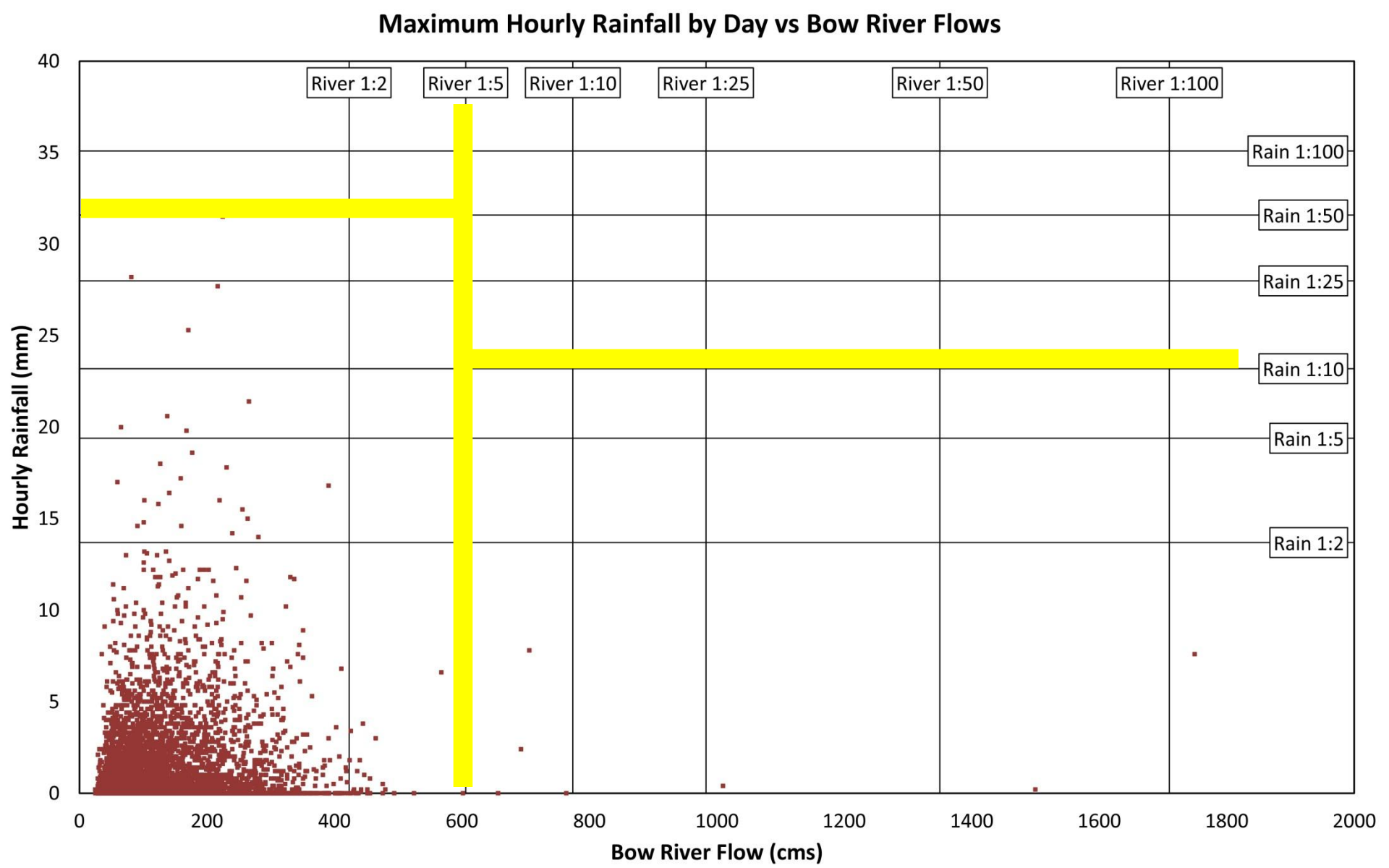
Existing B47 Lift Station
(5A Street & 1st Avenue)

- Currently unable to pump during gate closure

- Upgraded to Sunnyside Pump Station #2

Pump Station #2

- Condition 1: Low river, gates open
  - Will service only B47 area
- Condition 2: High river, gates closed
  - Will service:
    - B47, B48/B48A, B49, B51 and B53/53A areas
- McHugh Bluff
  - 1996 Geo-Engineering Report
  - 1997 Golder Associates Report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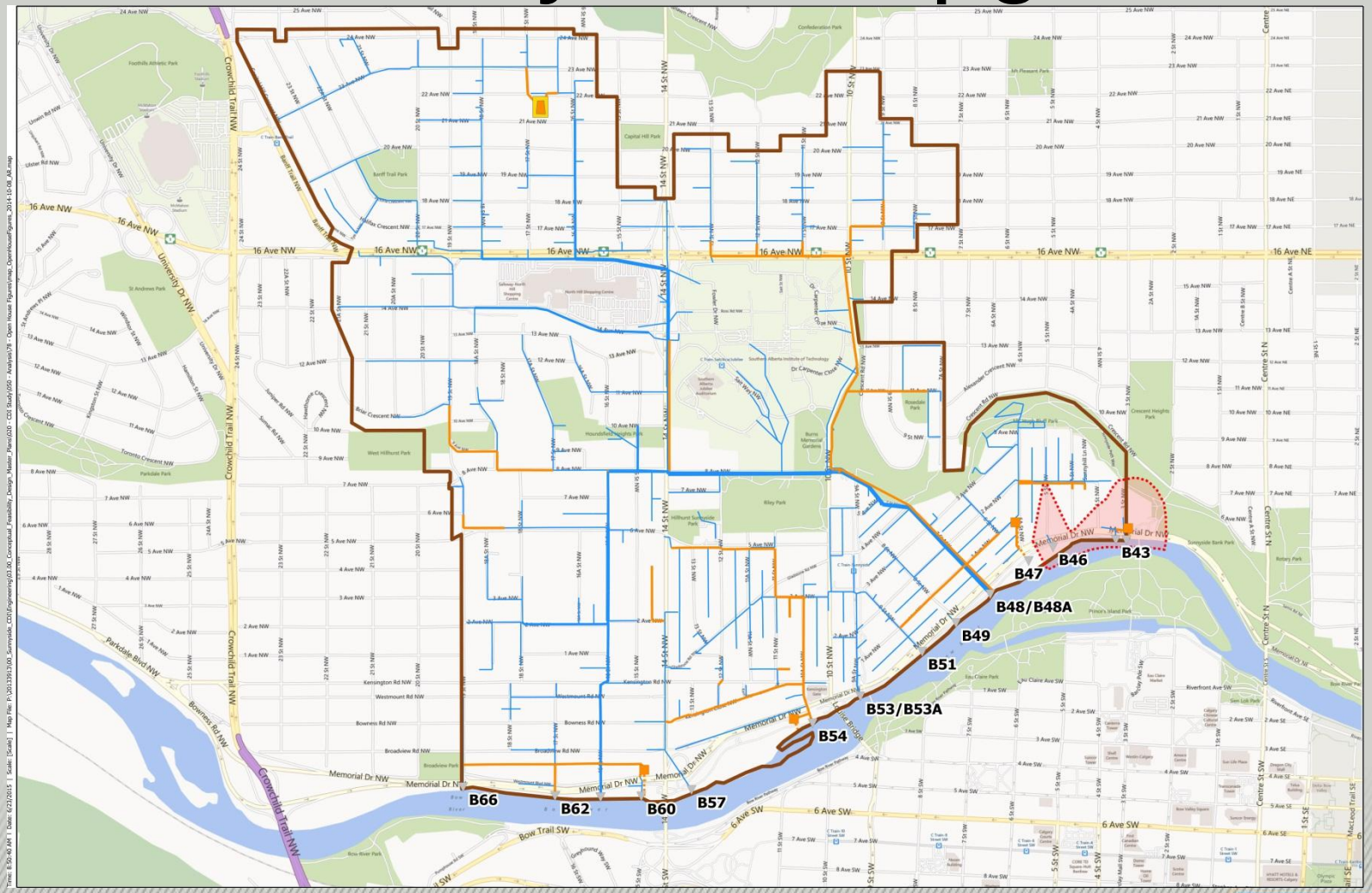
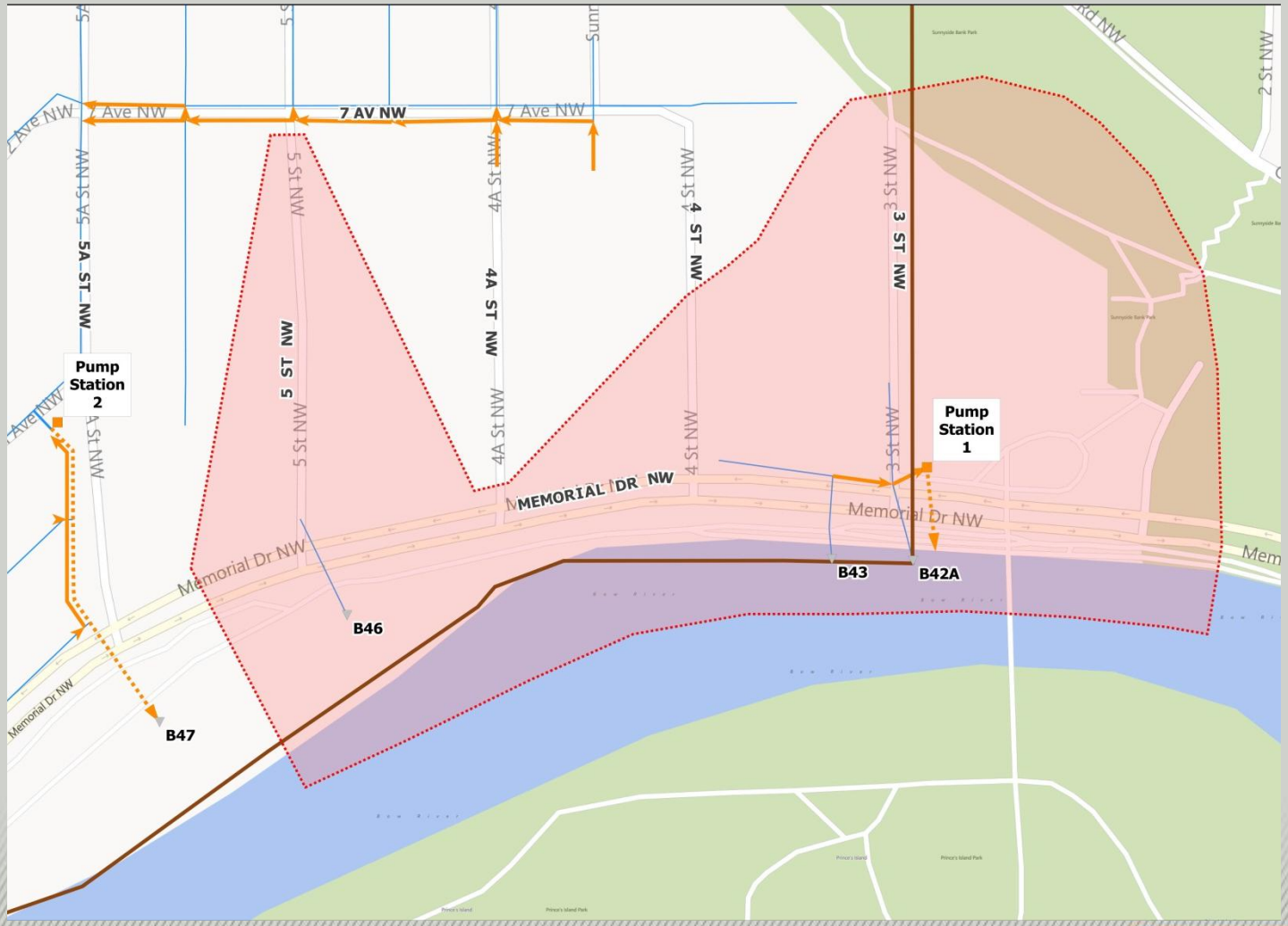
2015 Study Area Upgrades



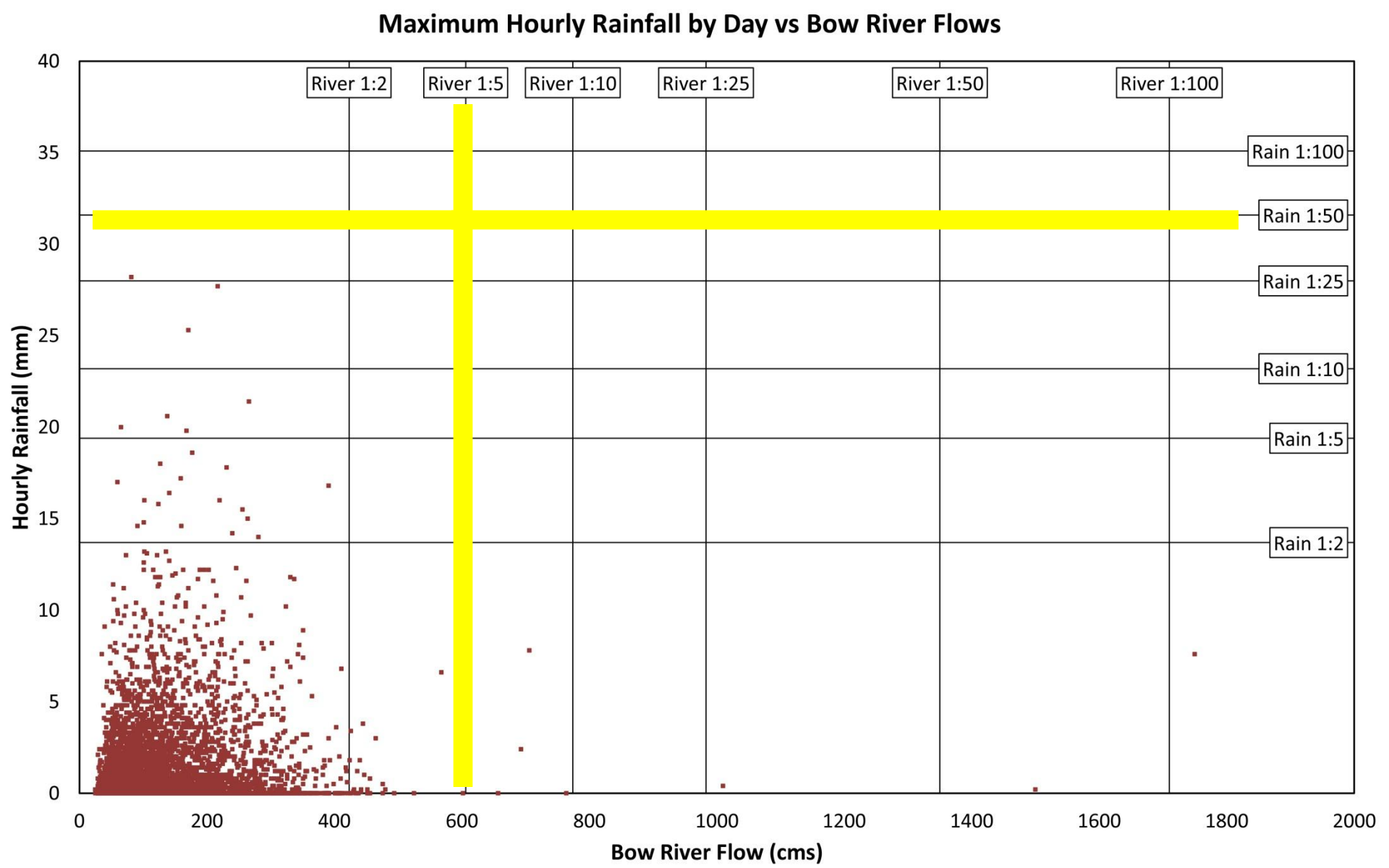
Sunnyside System

B42A
B43
B46



Pump Station #1

- Directly prevents flooding to residential property, ~110 homes
- Keeps Memorial Drive open for EMS, City Trouble Crews and citizens
- Flooding can inundate the Sanitary Lift Station: Prevents back up to basements, an additional ~220 homes
- Bonnybrook WWTP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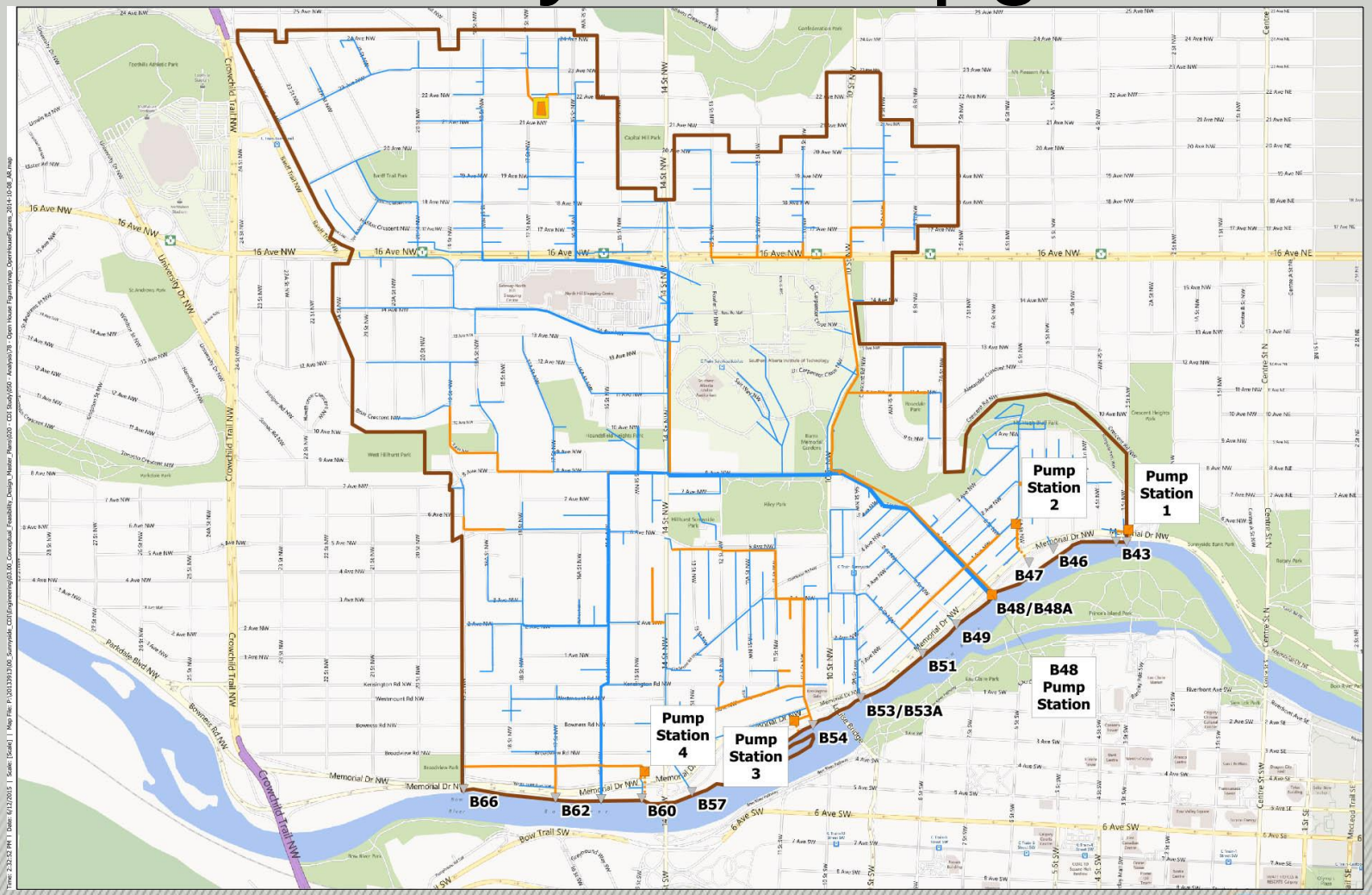

Triple Bottom Line Analysis - Draft

- Social, economic and environmental factors
- Costs and benefits of upgrades evaluated

Community Drainage Improvement Upgrade Prioritization List

Jan 2014 - Subject to refinement

			Net Benefit	Benefit/Cost Ratio	
Project Name	Capital Construction Cost ($k)	TBL Benefits ($K)	Net Total ($K)	Benefit Cost Ratio	Rank
Haysboro Project N	152	18,277	18,125	120.3	1
Westgate - Westgate 14th Ave SW Storm Pipe	2,071	41,776	39,706	20.2	2
Rosemont CDI	2,728	37,455	34,728	13.7	3
Optimist Park Dry Pond (Westgate)	10,215	132,888	122,673	13.0	4
Haysboro Project D	226	2,670	2,444	11.8	5
Tuxedo/Mnt Pleasant CDI - Local Improv'ts	545	5,904	5,359	10.8	6
Woodlands/Woodbine CDI - Pond D	15,637	148,482	132,845	9.5	7
Woodlands/Woodbine - Cedarbrae/Braeside CDI - Pond A	17,827	166,143	148,316	9.3	8
Tuxedo/Mnt Pleasant CDI - Phase 2	4,768	38,747	33,979	8.1	9
Palliser/Oakridge CDI - Phase 2	8,772	59,167	50,395	6.7	10
Woodlands/Woodbine CDI - Local Improvements	3,991	25,822	21,831	6.5	11
Pineridge / Rundle Dry Pond B	3,787	22,890	19,103	6.0	12
Palliser/Oakridge CDI - Phase 1	8,794	43,186	34,392	4.9	13
Pineridge / Rundle Storage Duct #2	2,562	12,577	10,015	4.9	14
NW Inner City Phase 2: Projects 2 - Upper Plateau Ponds	7,408	31,750	24,343	4.3	15
NW Inner City Phase 4: Proj's 4, 5, & 8 - Lower Plateau Piping	8,342	33,380	25,039	4.0	16
Tuxedo/Mnt Pleasant CDI - Phase 1	7,563	25,096	17,534	3.3	17
Shawnessy Stormwater Upgrades	18,318	46,272	27,954	2.5	18
NW Inner City Phase 1: Project 1 - Upper Plateau Pond	21,579	48,107	26,528	2.2	19
NW Inner City Phase 3: Project 3, 6 & 7 - Lower Plateau Piping	6,322	11,841	5,520	1.9	20
Palliser/Oakridge CDI - Phase 3	10,764	18,938	8,174	1.8	21
Westgate - Ditch Upgrade	4,114	5,698	1,584	1.4	22
Oakmount Dry Pond (Oakmont Way Rev Report)	446	561	115	1.3	23
Overall Totals	$ 166,928		$ 810,700	4.9	

Community Drainage Improvement Upgrade Prioritization List

Jan 2015 - Subject to refinement

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Optimist Park Dry Pond (Westgate)	10,215	132,888	122,673	13.0	1
Tuxedo/Mnt Pleasant CDI - Local Improv'ts	545	5,904	5,359	10.8	2
Woodlands/Woodbine CDI - Pond D	15,637	148,482	132,845	9.5	3
Woodlands/Woodbine - Cedarbrae/Braeside CDI - Pond A	17,827	166,143	148,316	9.3	4
Tuxedo/Mnt Pleasant CDI - Phase 2	4,768	38,747	33,979	8.1	5
Palliser/Oakridge CDI - Phase 2	8,772	59,167	50,395	6.7	6
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Pineridge / Rundle Storage Duct #2	2,562	12,577	10,015	4.9	10
NW Inner City Phase 2: Projects 2 - Upper Plateau Ponds	7,408	31,750	24,343	4.3	11
NW Inner City Phase 4: Proj's 4, 5, & 8 - Lower Plateau Piping	8,342	33,380	25,039	4.0	12
Tuxedo/Mnt Pleasant CDI - Phase 1	7,563	25,096	17,534	3.3	13
Shawnessy Stormwater Upgrades	18,318	46,272	27,954	2.5	14
NW Inner City Phase 1: Project 1 - Upper Plateau Pond	21,579	48,107	26,528	2.2	15
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Palliser/Oakridge CDI - Phase 3	10,764	18,938	8,174	1.8	17
Westgate - Ditch Upgrade	4,114	5,698	1,584	1.4	18
Oakmount Dry Pond (Oakmont Way Rev Report)	446	561	115	1.3	19
Overall Totals	$ 161,752		$ 715,699	4.4	

Community Drainage Improvement Upgrade Prioritization List

Jun 2015 - Subject to refinement

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Project Name	**Capital Construction Cost ($k)**	**TBL Benefits ($K)**	**Net Total ($K)**	**Benefit Cost Ratio**	**Rank**
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Pineridge / Rundle Storage Duct #2	2,562	12,577	10,015	4.9	10
NWIC Sunnyside Review	132,100	415,175	283,075	3.4	11
Tuxedo/Mnt Pleasant CDI - Phase 1	7,563	25,096	17,534	3.3	12
Shawnessy Stormwater Upgrades	18,318	46,272	27,954	2.5	13
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Westgate - Ditch Upgrade	4,114	5,698	1,584	1.4	15
Oakmount Dry Pond (Oakmont Way Rev Report)	446	561	115	1.3	16
Overall Totals	$ 250,202		$ 917,345	3.7	

Moving Forward

- Finalize the 2015 Report
- Update the Stormwater Upgrade Prioritization List
  - Including Finalized TBL Analysis

Questions?

Thank you for your patience
and assistance!