INITIAL OPTIMIZATION RESULTS
BEND OPTIMIZED COLLECTION SYSTEM PLAN

November 21st, 2013

DRAFT RESULTS – SUBJECT TO CHANGE

MSA Murray, Smith & Associates, Inc. Engineers/Planners

AGENDA

- Welcome/Introduction
- Review of Nov 14 Takeaways
- Sensitivity Analysis
- CSMP Related Projects Update/Discussion
- Community Outreach
- Next Steps
- Nov 14 Questions
- Public Comment

City of Bend
Collection System Master Plan

Overall 2033
Optimization Alternatives

November 2013

Murray, Smith & Associates, Inc.

Legend

- L — New Lift Station
- L — Decommissioned Lift Station
- L — Lift Station Upgrade
- WWTP — Satellite Treatment
- Offline Storage
- Existing Sewer Pipe

Alternatives

- Gravity Upgrade Along Existing Alignment
- Gravity Diversion
- Force Main Upgrade Along Existing Alignment
- Force Main Diversion
- New Pump Station Force Main
- Gravity or Force Main
- In-Line Linear Storage
- Flow Control Piping
- Planning Boundary

Sewer Basin

1
2
3
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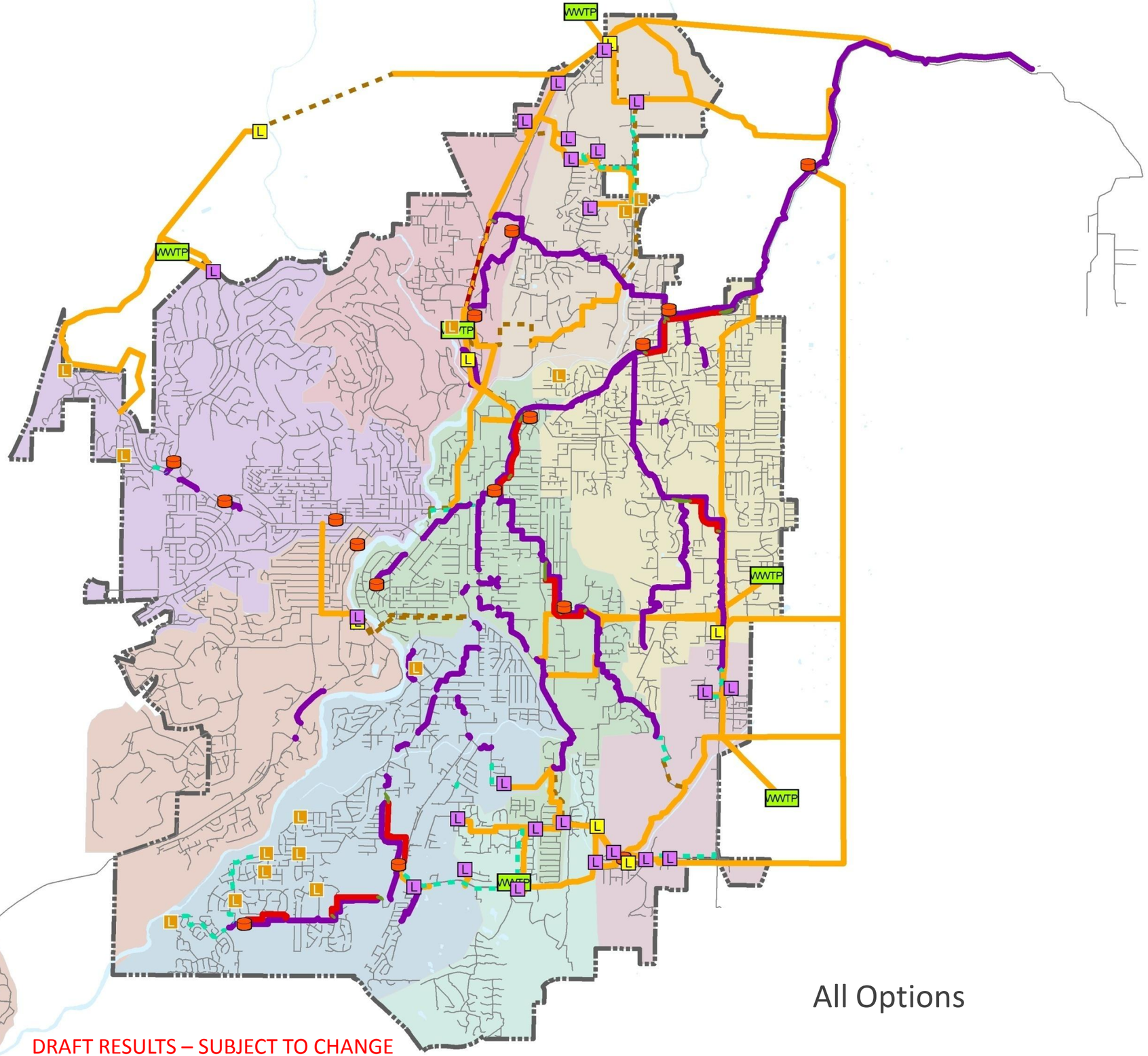

All Options

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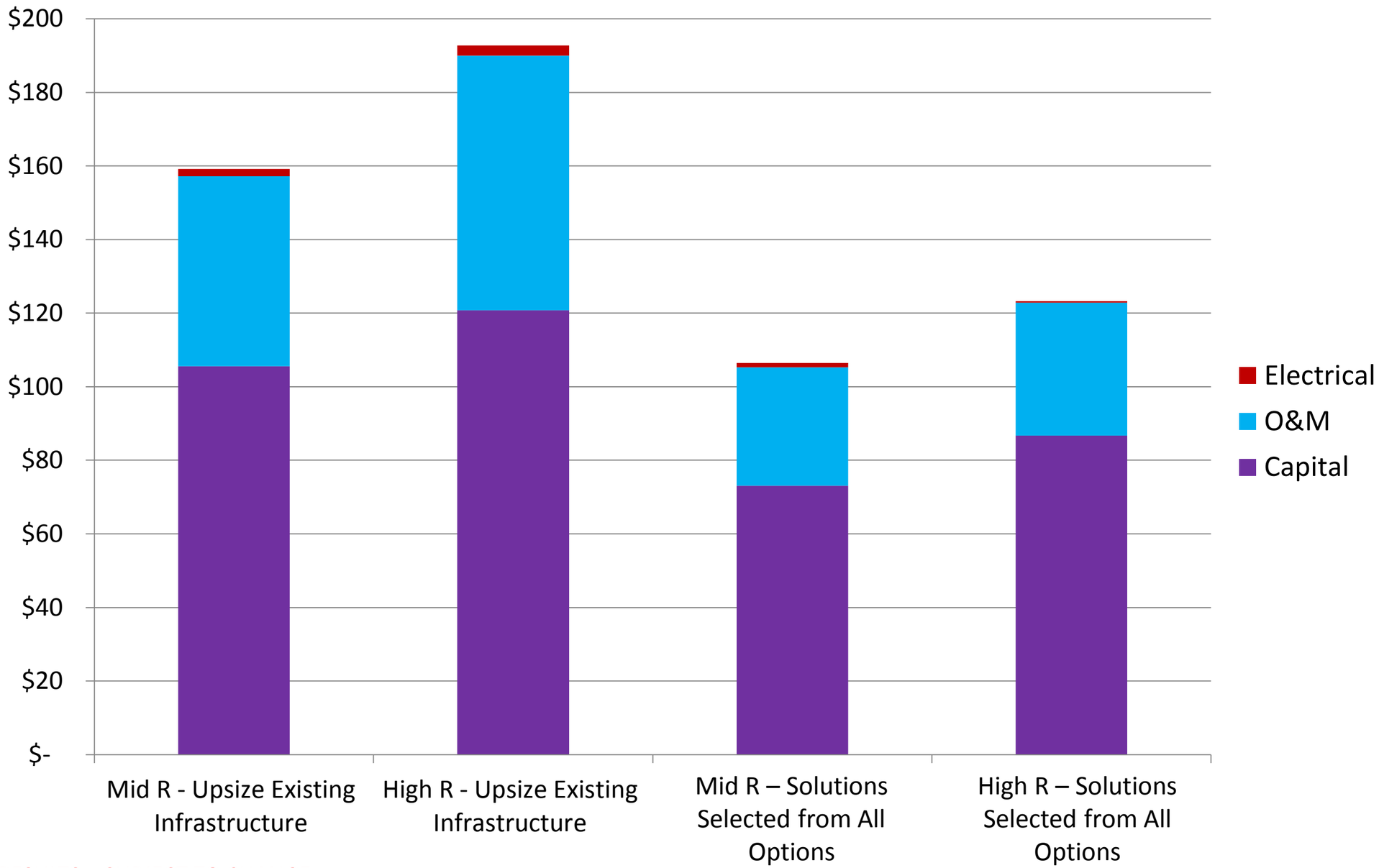
40 YEAR LIFE CYCLE COSTS
(MILLION DOLLARS)



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ALL OPTIONS
(20-Year, Mid R)

Cost Item	Cost ($M)
40-Y Life Cycle O&M Cost	32.20
40-Y Life Cycle Elect. Cost	1.20
40-Y Life Cycle Capital Cost	73.10
40-Y Total Life Cycle Cost	**106.50**

Initial Capital Cost	**68.46**

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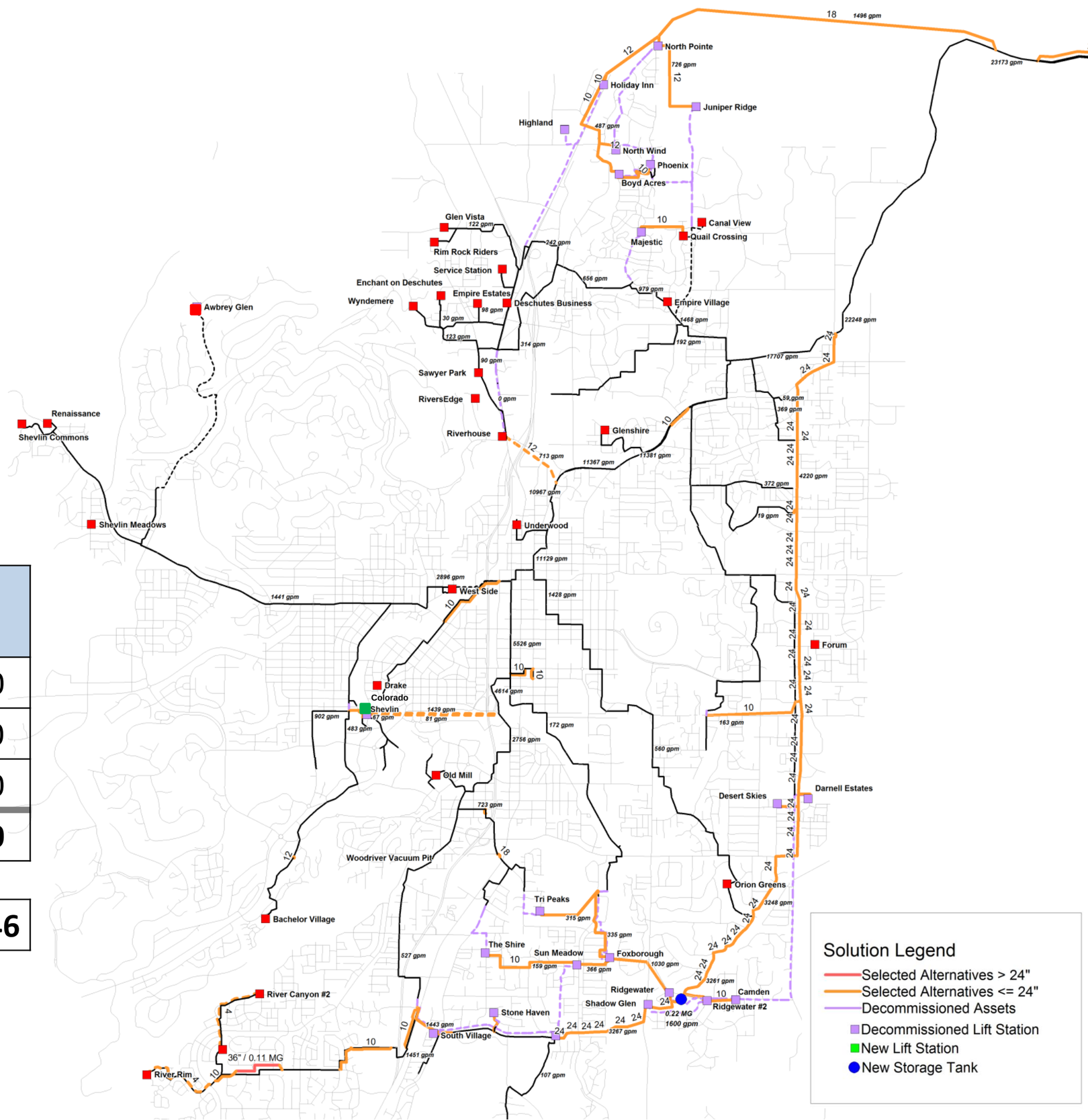

ALL OPTIONS
(20-Year, High R)

Cost Item	Cost ($M)
40-Y Life Cycle O&M Cost	36.10
40-Y Life Cycle Elect. Cost	0.40
40-Y Life Cycle Capital Cost	86.72
40-Y Total Life Cycle Cost	**123.22**

Initial Capital Cost	**86.14**

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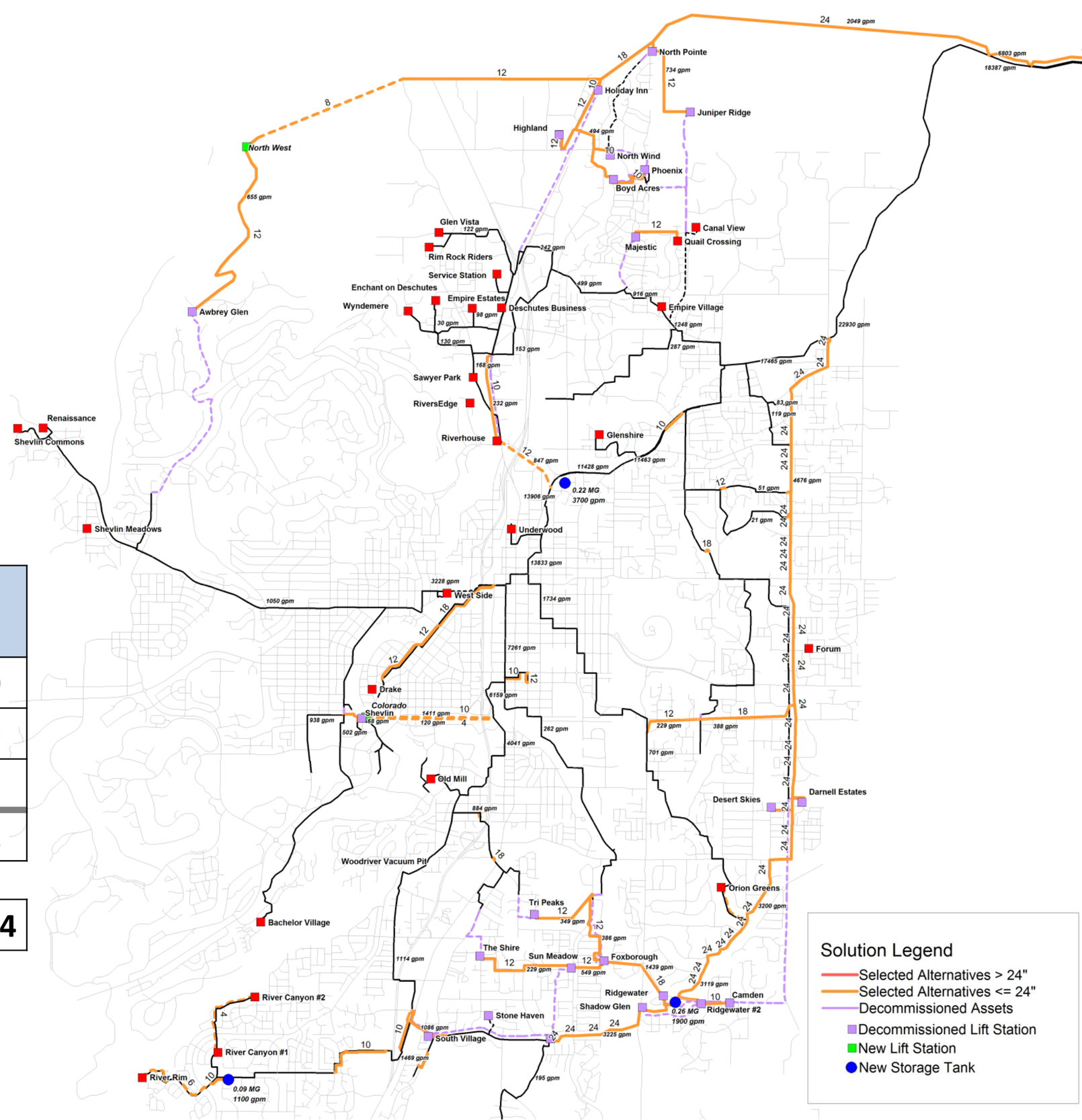

HIGH LEVEL TAKEAWAYS

Solution Component	Trends Observed	Additional Refinement
General	• Similar solutions selected in both Mid R and High R • Cost difference between Mid R and High R • Upsizing existing infrastructure has higher life cycle costs	• Model verification based on add. flow monitoring • Evaluate project phasing
Southeast Interceptor	• Always selected • Size relatively consistent with current design • 27th St alignment selected	• Future growth sensitivity • Test Colorado extension
Colorado LS	• Always selected	• Option to connect to SEI
Storage	• Three locations consistently selected for storage	• Site specific costs
Northern System	• Northern Interceptor consistently selected • Upgrade of existing gravity/force mains not selected • Northwest Interceptor only selected in High R	• OB Riley alignment and several other alignment alternatives to be included
Treatment	• Low treatment cost used to favor treatment • Treatment not selected	• No further evaluation anticipated
Existing Lift Stations	• Decommission the majority of existing lift stations where gravity alternatives existed	• Effect of phasing

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PROPOSED SENSITIVITY ANALYSES

- To be conducted before January SIAG
  - Continued Mid R and High R evaluations
  - Growth Node Evaluation (next slide)
  - Water Conservation (10% reduction in dry loading)
  - Micro Optimization of North Area Common Force Mains and Lift Stations (in conjunction with O.B. Riley Rd. Alt.)
- Not currently recommended by City
  - OSU Growth Area (believed to be adequately covered in development of future planning data)

GROWTH NODES

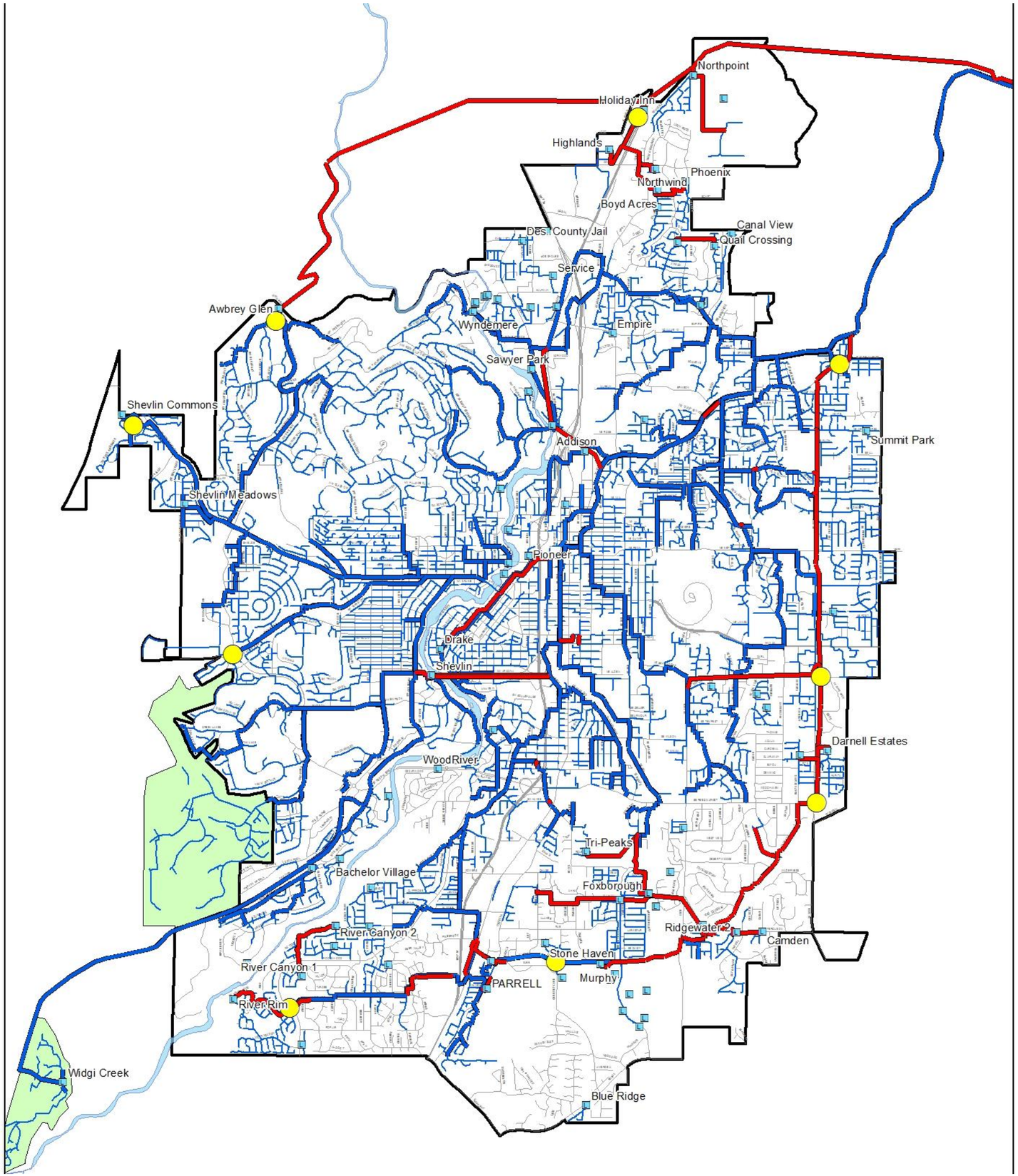

FIGURE 1
CITY OF BEND, OREGON
GROWTH SENSITIVITY

- Growth Node
- UGB
- Contracted Area
- Lift Station
- Improved Pipeline
- Existing Pipeline
- Model Pipeline

0 2,500 5,000 Feet

N

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COLORADO LIFT STATION

- Colorado LS consistently selected
- 30% design complete in December
- Current capacity 2,300 gpm
- Dual 12-inch force mains
- Begin construction in Aug/Sep 2014
- Operational mid 2015

NORTH AREA SOLUTIONS

- NE Interceptor consistently selected
- Riverhouse diversion likely short-term solution
- Phasing needs to be confirmed
- Additional North Area options being evaluated
- North Area design team selected
- Design team will work with CSMP team to identify solution(s) over next few months

SE INTERCEPTOR

- SEI consistently selected
  - Regardless of credit for design costs
- Current design serves build-out of current UGB
- Key for growth/improvements in other areas
  - SEI creates capacity in central int. allowing city-wide growth
  - Colorado Lift Station
  - Riverhouse Diversion
- Continued refinement of solution by CSMP team unless directed otherwise by SIAG

SE INTERCEPTOR

- What we know
  - SEI consistently selected
    - Regardless of credit for design costs
  - Current design serves build-out of current UGB
  - Key for growth/improvements in other areas
    - SEI creates capacity in central int. allowing city-wide growth
    - Colorado Lift Station
    - Riverhouse Diversion
  - Redesign will delay project approx. 1 year
  - Low risk of stranded assets
  - ROW acquisition issues

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SE INTERCEPTOR

- What we don't know
  - Phasing of required improvements over next 20 years
  - Impact of additional growth on system
  - Impact of refined rainfall response
  - What other solutions may be identified through optimization process
  - Ability to accelerate the SEI construction
    - Construction sequencing
    - Financing capability

SE INTERCEPTOR QUESTIONS

- Is SIAG ready to make a recommendation related to SEI?

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NEXT STEPS / INTERMEDIATE OPTIMIZATION

Input Refinement

- Site specific costs
- Review alignments
- Additional alternatives
- Review storage

Phasing Analyses

- 10-year planning horizon

Sensitivity Analyses

- Wet-weather flow sensitivity analysis
- Loading sensitivity analysis (growth nodes)
- Indoor water conservation

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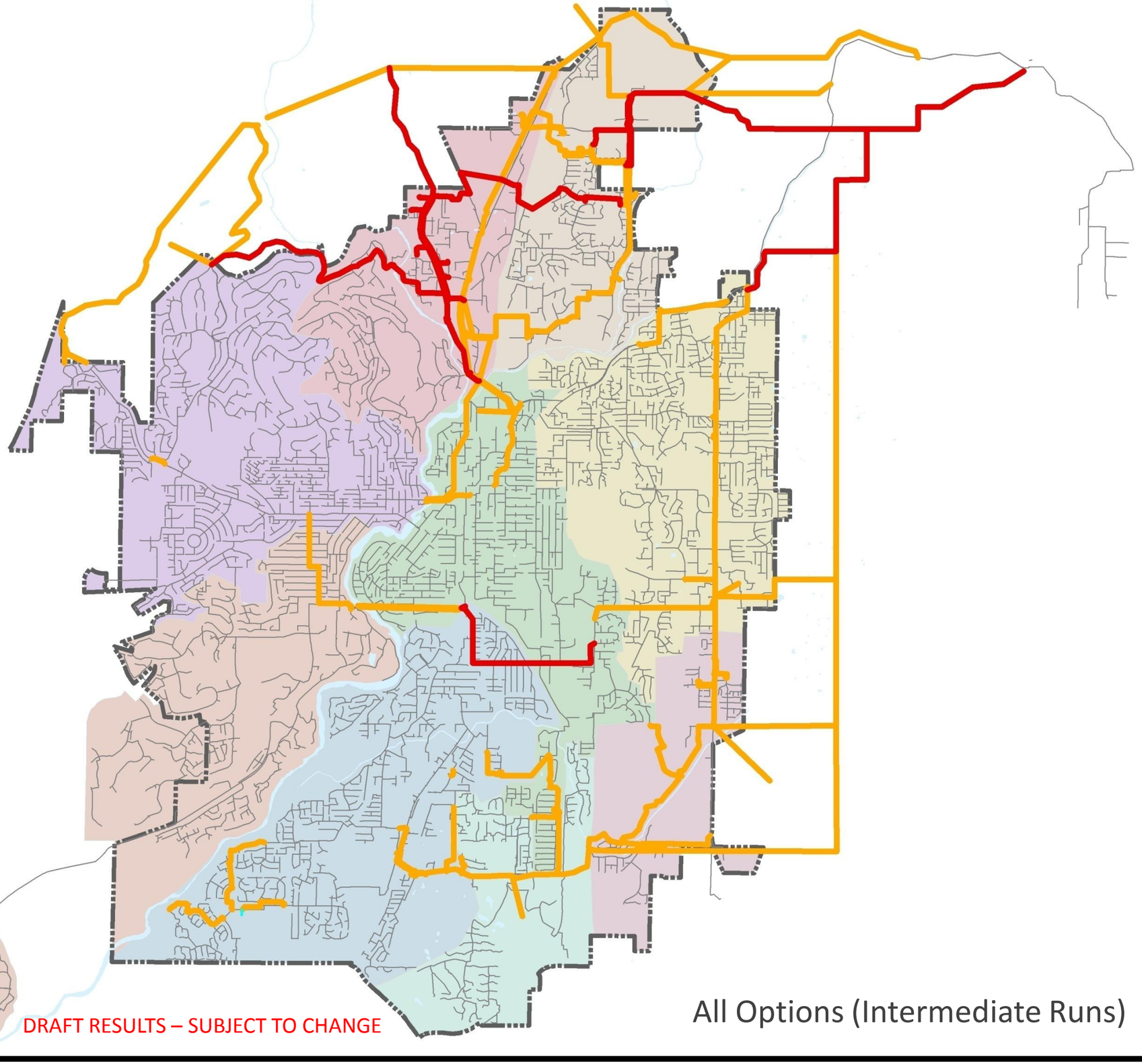
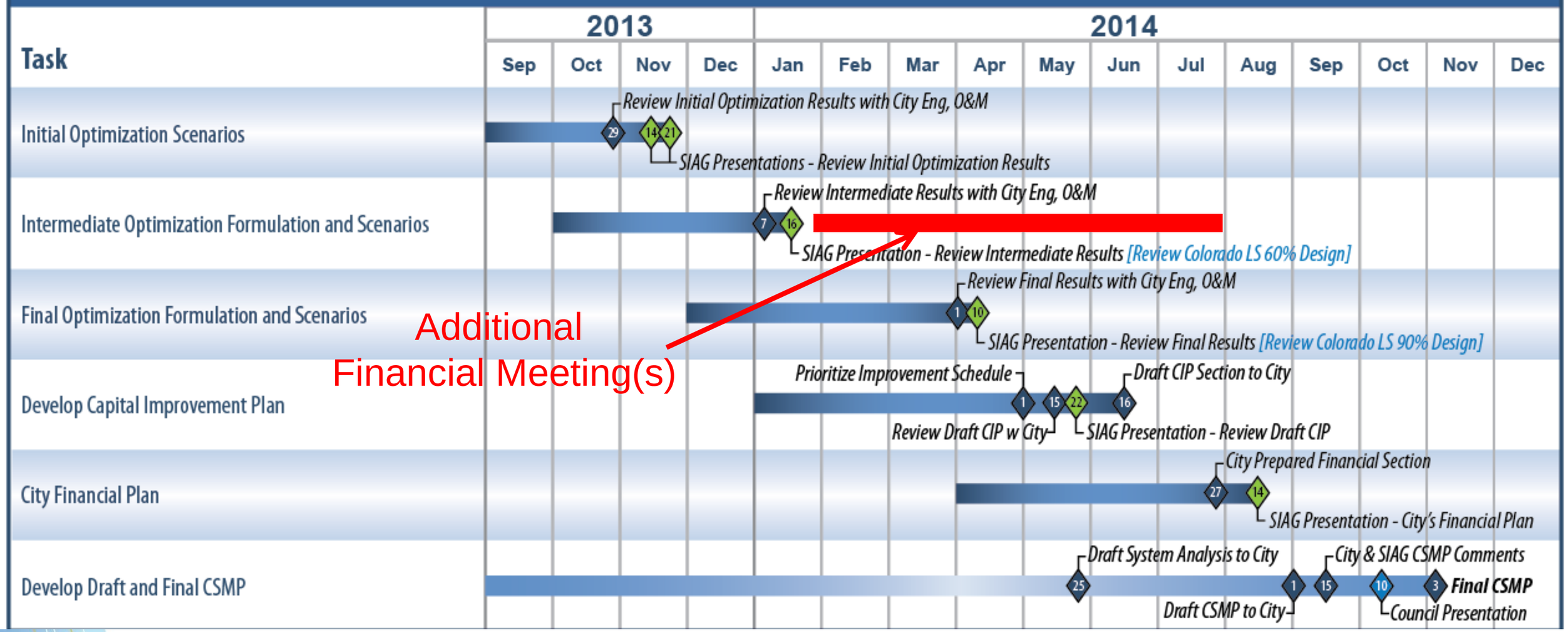
BEND OREGON



SCHEDULE REVIEW

DRAFT CONDENSED PROJECT SCHEDULE (AS OF NOVEMBER 12, 2013)

CITY OF BEND
OPTIMIZED SEWER COLLECTION SYSTEM MASTER PLAN



Additional Financial Meeting(s)

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OUTREACH SCHEDULE ITEMS

- Nov: Develop materials
- Nov-Dec: Schedule 2014 community briefings
- Jan-Feb: Community briefings / City communications
- Mid-March: Media Outreach
- April: Public open house / City communications