

## Reuse: An Option? Exploring Nampa's Discharge Alternatives

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## Agenda

- Introduction
- Background
- Reuse Fatal Flaw Analysis
  - IDEQ Collaboration
  - Reuse Alternative Evaluation
- Discharge Alternatives Evaluation
  - River Discharge
  - Reuse for Irrigation
  - Reuse for Infiltration
- Next Steps Forward
- Summary

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## Presentation Objective

- Provide background on Nampa's Reuse Evaluation
- Provide information on alternatives towards meeting future regulatory requirements
- Describe how Nampa will make a final decision

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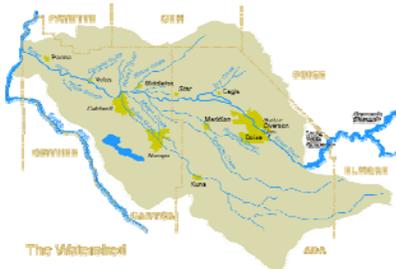
## Thanks to the Various Contributors

- MWH
- Brown and Caldwell
- CH2M Hill
- Murray, Smith and Associates
- J-U-B Engineering
- Bennett Engineering
- RBCI

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## Background

- SR-HC TMDL key driver for Lower Boise River
- Nampa is key stakeholder on LBR
- City pursued WWTP Facility Plan Update to address key issues



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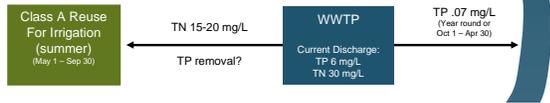
## MWH Completed 2009 Facilities Plan Update

- FPU evaluated 17 alternatives based on combination of:
  - Point of discharge
  - Seasonal vs. year-round TP limits
  - Class A, B, or C effluent quality
  - Treatment technology (chemical, bio-P)

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## City Needed to Address Upcoming Low TP limits and Plan for Growth

- 2009 Wastewater Facility Plan Update recommendations:
  - Utilize phased approach based on seasonal vs. year-round TP limit
  - Combination reuse and river discharge



- Assumptions:**
- TP limit of .07 mg/L (seasonal or year round)
  - Reuse TN limit of 15-20 mg/L
  - Infiltration TN limit of 5-10 mg/L

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## Reuse Considerations

- City-wide existing pressurized irrigation system considered favorable for reuse
- Pilot testing of reuse at golf courses and cemeteries
  - Significant financial commitment
- On paper, reuse fits Nampa . . . but
  - Regulatory concerns
  - Public Works Director life cycle

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## Next Step: Conduct Reuse Fatal Flaw Analysis

- The recommendations in the Facility Plan Update resulted in a fork in the road:



City decided to perform a Fatal Flaw Analysis on Reuse

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## Steps of the Fatal Flaw Analysis

- Brown and Caldwell:
  - Benchmark Reuse Rules
  - Identify strategic fatal flaw issues
  - Conduct site visit of working Class A Program
  - Engage IDEQ on fatal flaw issues
  - Evaluate reuse costs and compare
- Concurrently, J-U-B Engineers performing evaluation of pressurized irrigation system
  - Determine reuse demand and probability of seasonal use
  - Review regulations relating to irrigation system

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## First Step: Reuse Rules Benchmarking

- Compare Idaho Reuse Rules to other states with mature reuse programs
- Idaho's rules comparable to most western states
  - Minor areas where more stringent (compared to Nevada)

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## Second Step: Fatal Flaw Workshop

- What are the major Reuse issues that could impact City's decision?

Reuse Fatal Flaw Issues	
Reuse Cost	Existing Irrigation System
"Shoulder Months" discharge	Time of Use Restrictions
Precipitation Events During Irrigation	Overspray
Class A Rules	Water Rights
Citywide model for Nitrate	Public Perception
Groundwater Impact Study	Cumulative Impacts
Additional Issues for Consideration	
Microconstituents	Temperature TMDL
Verify Jurisdiction of Regulators	Potential Climate Change Legislation
Coordination with Irrigation Districts	

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## LOTT Wastewater Alliance Site Visit

- Meeting with LOTT Executive Management:
  - Emphasized public involvement; create the need, not the solution
  - Include all stakeholders
  - Operational considerations
  - Long-range plan with manageable tasks
  - Water quality, then water quantity
- Site Tours



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## IDEQ Meeting #1: Strategic Discussion

- Initial meeting with Director Hardesty and staff
  - Emphasized importance of decision to City
  - Gained insight into IDEQ Reuse Program goals
  - Discussed IDEQ key Class A Reuse concerns
  - Discussed regulatory framework
    - NPDES permit
    - Rules for Reclamation and Reuse
    - Ground Water Quality Rule

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## IDEQ Meeting #2: Working Session

- Detailed discussion of Reuse Fatal Flaw Issues
- Key Outcomes:
  - Overspray is manageable through BMPs
  - Total Nitrogen is key groundwater quality concern
  - Existing irrigation system would require pressure testing on a spot check basis
  - Importance of Reuse System Plan of Operation and Management
  - Potential for pollutant trading

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## Key Regulatory Items to be Resolved

- Ground Water Quality Rule
- Groundwater Impact Study needed
  - Include City areas where reclaimed water may be applied
  - Include infiltration basins used for “shoulder season” discharge
- Total Nitrogen limit based on specific areas of application

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## Project Evolution

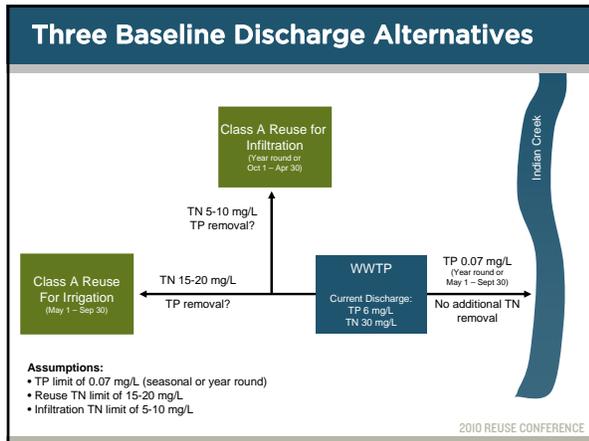
- From Reuse Fatal Flaw Analysis to Discharge Alternatives Evaluation
- Drivers for this transition:
  - Costs to implement reuse program
  - Need for discharge alternative for “shoulder season”

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## Discharge Alternatives Evaluation

- Cost comparison of reuse vs. other discharge alternatives
- Baseline alternatives with various combinations
  - Surface water discharge
  - Reuse for infiltration
  - Reuse for irrigation
- “Other Alternatives” raised the potential for year round infiltration

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### Order of Magnitude Costs Developed

Additional discharge alternative	Estimated capital costs	Estimated 24-year net present value
<b>Three baseline alternatives</b>		
Surface water discharge only (seasonal TP of 0.07 mg/L)	\$51,000,000	\$108,000,000
Reuse for seasonal infiltration (river discharge in winter with no TP removal)	\$55,000,000	\$69,000,000
Class A reuse for seasonal irrigation (river discharge in winter with no TP removal) <sup>a</sup>	\$115,000,000	\$151,000,000
<b>2009 Facilities Plan Update alternatives</b>		
Alt. 4A: surface water discharge only (year-round TP of 0.07 mg/L)	\$51,000,000	\$199,000,000
Alt. 13A: reuse for summer irrigation with winter river discharge at 0.07 mg/L TP	\$118,000,000	\$241,000,000
<b>Additional alternatives</b>		
Reuse for year-round infiltration	\$55,000,000	\$76,000,000
Class A reuse for seasonal irrigation and winter infiltration	\$102,000,000	\$119,000,000

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- ### Results of Reuse Fatal Flaw Analysis and Comparison of Alternatives
- Cost of Class A Reuse for residential irrigation is high
  - Class A Reuse for Direct Infiltration alternative being investigated further
    - Brown and Caldwell currently performing preliminary hydrogeologic evaluation for infiltration
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- ### Direct Infiltration Alternative
- Assumes no treatment by soil column
  - Meet Class A Reuse requirements
  - Meet Ground Water Quality Rule
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- ### Steps Forward
- Direct Infiltration Alternative Issues:
    - Travel time for TP to reach drains or other Waters of the US
      - Would establish effluent TP limit
    - Ground Water Quality Rule
      - TDS
  - Wastewater Program Management
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- ### Nampa WW Program Drivers
- Financial magnitude of decision
  - Regulatory uncertainty
  - Multiple consultant technical evaluations
  - Promising new and unexplored alternatives
  - Unknown importance of non-financial factors
  - Best solution for Nampa is unclear
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## WW Program First Steps

### GOALS:

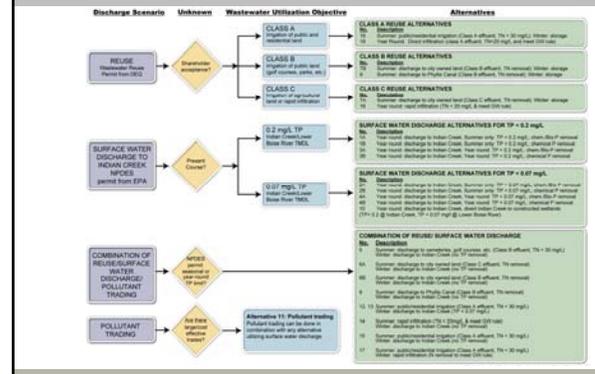
- Leverage existing work
- Broad understanding of alternatives, pros/cons and regulations
- Identify Nampa specific alternative evaluation criteria
- Solutions that balance cost, technology and level of service

### HOW:

- Decision Tree Diagram (working figure)
- Stakeholder Education/Input

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## Decision Tree Diagram



## WW Program Next Steps

### GOALS:

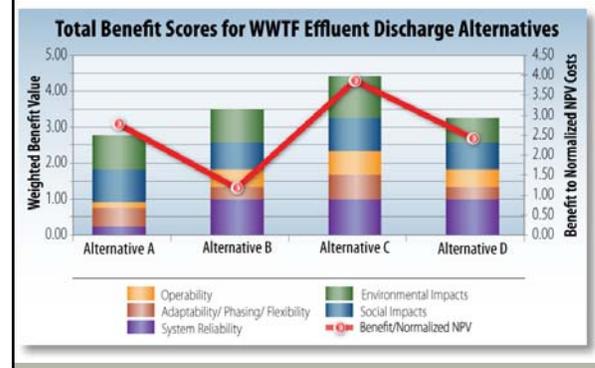
- Narrow the field of focus
- Identify and prioritize additional work
- Preliminary ranking of alternatives

### HOW:

- Decision Tree Diagram (working figure)
- Stakeholder Education/Input
- Benefit/Cost Analysis

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## Alternative Ranking - Benefit/Cost Analysis



## WW Program Decision Process

### GOALS:

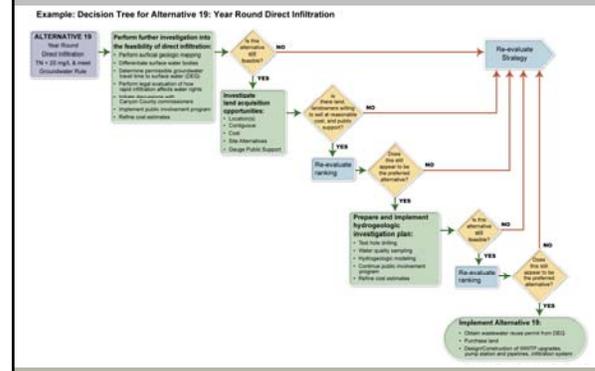
- Move ahead even with uncertainty
- Document solution path(s)
  - Historical understanding
  - Course corrections not catastrophic

### HOW:

- Stakeholder Education/Input
- Advance top alternatives via Decision Tree

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## Alternative Decision Tree Example



## WW Program Execution Phase

### ASSIST CITY:

- Select Nampa's preferred solution
  - unknowns resolved or risks manageable
- Issue Detailed Design RFPs
  - MSA will not pursue resulting detailed design RFPs
  - Open to consultants who perform supporting technical work
- Coordinate Design and Construction Activities

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## Summary

- Reuse an Option?
  - Yes, but . . .
- Nampa is determined to find best fit solution
  - Many factors that need to be considered
  - All steps have substantial cost
    - Costs are lumpy
  - Public input is a key factor
  - City continues to explore alternatives
- Stay tuned

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# QUESTIONS?

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## Cost Analysis of Alternatives

- Additional facilities required for each alternative

Class A Reuse	Infiltration	River Discharge
Fermentation	Side Stream Nitrogen Removal	From 2009 Facility Plan
Side Stream Nitrogen Removal	Additional Disinfection Facilities	
Additional Disinfection Facilities	Pipeline and Pump Station	
Reuse Storage		
Distribution Pipeline and Pump Stations		
TP Removal upgrades from 2009 Facility Plan		

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