



City of Meridian Reclaimed Water Program

Citywide Class A Water Reuse Permit

Idaho Water Reuse Conference Panel Discussion

June 14, 2009

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Reuse in the City of Meridian



Meridian & Reuse: Some Context



- Center of the Treasure Valley
- Suburb of Boise
- Was One of the Fastest Growing Cities in the Country:
 - Population Tripled from 1990 to 2000
 - Population Doubled from 2000 to 2008
 - Current Population = approx. 72,000
- 41.7 Square Mile Area
- 402 Acres of Open Space
- 24 Miles of Creeks and Streams

Picture this...

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Idaho Statesman



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New Residents and Businesses Flock to Meridian, where Water is Used Wisely

By John Miller
Idaho Statesman

While governments in water-scarce regions are looking for ways to expand water recycling and reuse, they often have difficulty finding information on the policy options from which they must choose. The purpose of this white paper is to provide a guide to water recycling, reuse, and reuse water reuse programs. It is intended to help governments, businesses, and individuals understand the options available to them and to help them make informed decisions about water reuse.

Recognition: awards and certification programs.
Information dissemination and educational outreach efforts:
Reporting of water consumption, discharge, and waste data.
Removing Barriers:
Motivating local regulators: that realize that all water need quality standards.
Supporting planning, construction, and operation: of water reuse programs.

of recovered water:
Pricing mechanisms:
Regulatory relief for recycled water users:
Government procurement of water recycling/reuse equipment. Structuring of water rights to assure the use of potable water.
Mandates and Regulations: requiring utilities to develop and use recycled water.
Incentives: to encourage investment in water reuse.
Regulatory relief: to encourage investment in water reuse.

governments to evaluate the appropriate mix of policies that will best fit their needs. For some, tools applied elsewhere for one type of water use may be applied in a different use. For others, information will be sought to gain a better understanding of the regulatory requirements will be more effective.
Investment:
Water recycling and reuse: must be supported by governments. The best model for water reuse is to encourage investment in water reuse.

is to help communities and other governmental authorities think through their options for increasing recycling and reuse of water in their area. The paper is built around a menu of policies that are being used in different locations, including efforts to:
Provide more information: on water recycling and reuse efforts.
Reduce barriers: to water reuse.
Provide financial incentives: to encourage investment in water reuse.

Why Reuse?

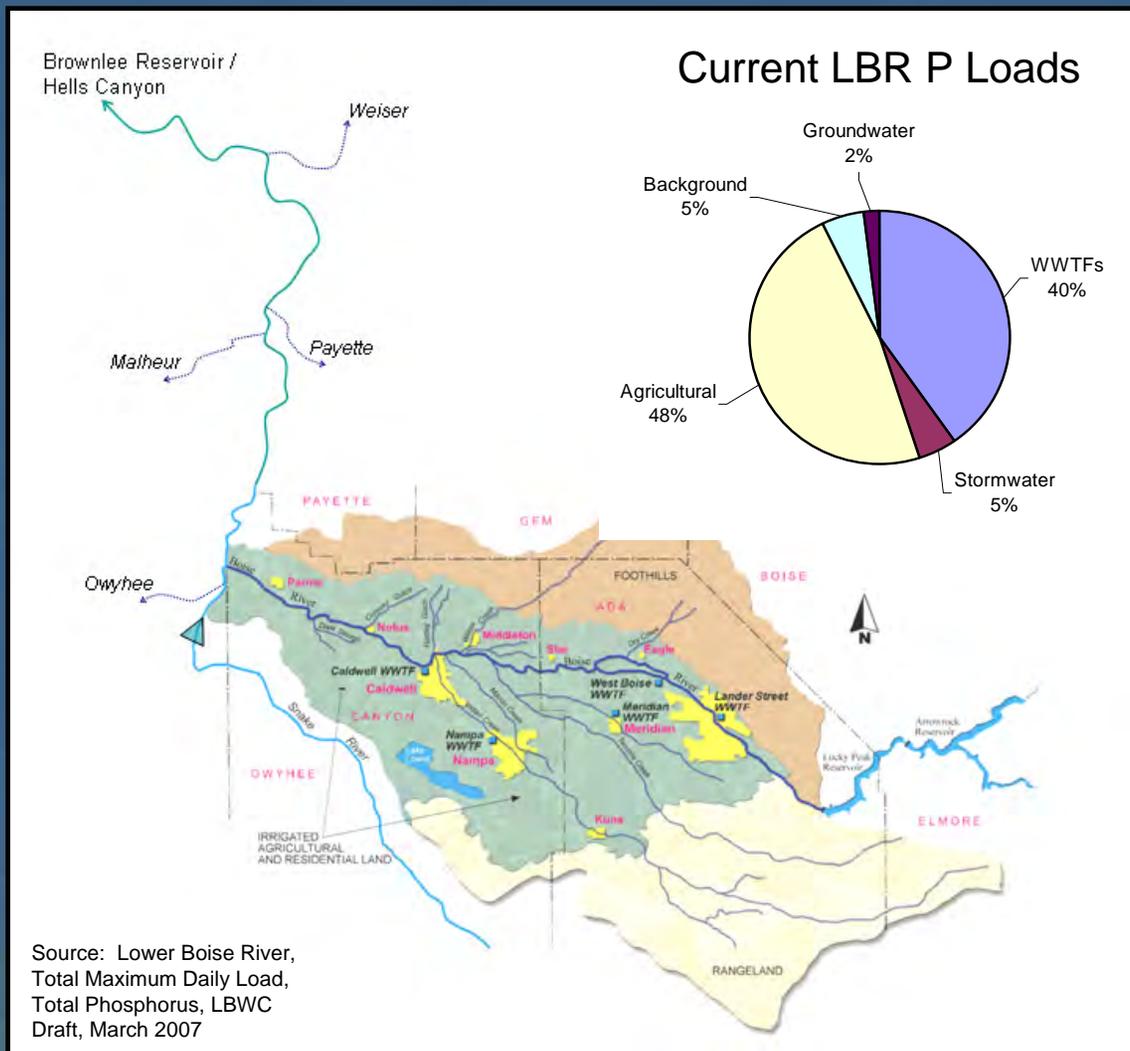
**Each Organization Has To Determine
The Cost vs. Benefits For Reuse**

In Meridian, There Are Four Primary Drivers:

- 1) Increasing Surface Water Quality Regulations
 - a) TMDL for P
- 2) WWTP Capacity / NPDES Permit Limits
- 3) Domestic Well Impacts
- 4) Sustainability & Vision

Why Reuse?

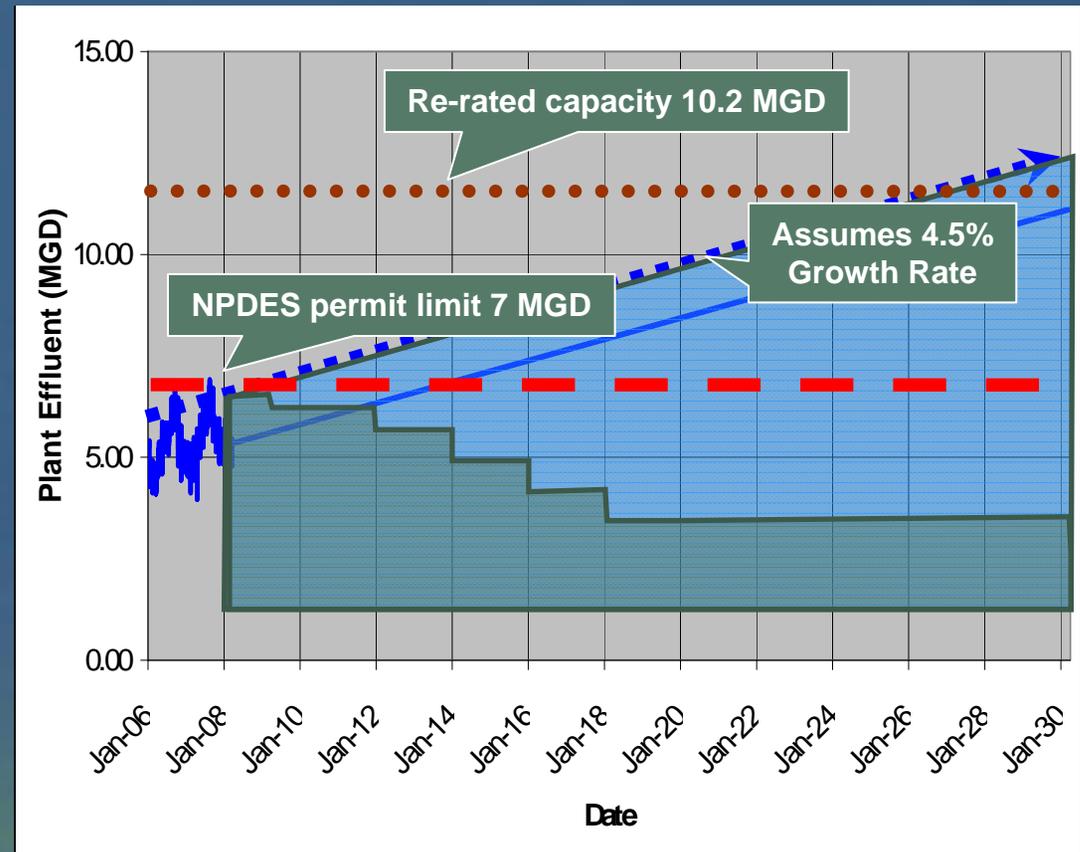
Surface Water Quality Regulations



- **Existing Boise River TMDL:**
 - Sediment
 - Bacteria
 - Temperature
- **Proposed Phosphorus Load Allocations**
 - LBR Contributes 8% of SR-HC Load
 - 80% Reduction in 1 Permit Cycle
 - 98% Reduction in 3 Permit Cycles

Why Reuse? NPDES Flow Limits

- **EPA NPDES Permits:**
 - Meridian Plant is Flow Restricted under NPDES
 - EPA Continues to Delay Renewal of NPDES Permits
 - Operating Under 1999 Flow Limits (7 MGD)
 - Applied in 2004
 - No Action by EPA
- **Plant Capacity:**
 - IDEQ-Approved Re-rating at 10.2 MGD



Why Reuse?

Domestic Well Impacts

- **Meridian Water Consumption**
 - Winter Average = 148 million gallons/mo
 - Summer Average = 318 million gallons/mo
- **Summer Irrigation Activity Increases Demand by 170 million Gallons/mo**
 - Potential Conservation of 1.2 billion gallons per year through reuse



Why Reuse?

Vision for Sustainability

“Our Wastewater Treatment Plant, by the year 2030, will be self-sustaining – utilizing closed-looped systems to recycle and/or reuse 80% of the waste stream via water reclamation, co-generation, and nutrient recycling strategies.”

- **Strategies Include:**

- Nutrient recovery
- Composting
- Energy efficiency
- Renewable energy
- Reclaimed water use



City of Meridian's Approach to Reuse



Meridian's Approach: Testing the Water

First Class A Reclaimed Water Permit Issued To A City At Heroes Park

- Overcome Challenges:
 - Educate & Build Support with Elected Officials
 - Educate & Build Support with Parks Staff
- Obtain a Project Site Permit First
- Obstacles:
 - Effluent Quality
 - Nitrogen Content
 - Soil Loadings
 - Disinfection
 - Overspray (Park Amenities)
 - Seepage Tests
 - Production Demand & Redundancy
- Supply expected Spring 2009



Meridian's Approach: Testing the Water

Develop Partnerships and Leverage Resources

- Community Park Improvements
- Pilot-Test Impacts
- Build Community Support With Tangibles

Park Features:

- Reclaimed Water Interpretive Plaza and Fountain
- Reuse Sourced Restrooms
- Heroes Plaza Educational Planters
- Interpretive Pathways with Drought Tolerant Vegetation and Landscapes
- Water-wise Demonstration Garden



Meridian's Approach: Testing the Water

Develop Partnerships and Leverage Resources

- Get Knowledgeable Help
- Develop Understanding of Limitations and Impacts
- Establish Productive Working Relationships with Regulators



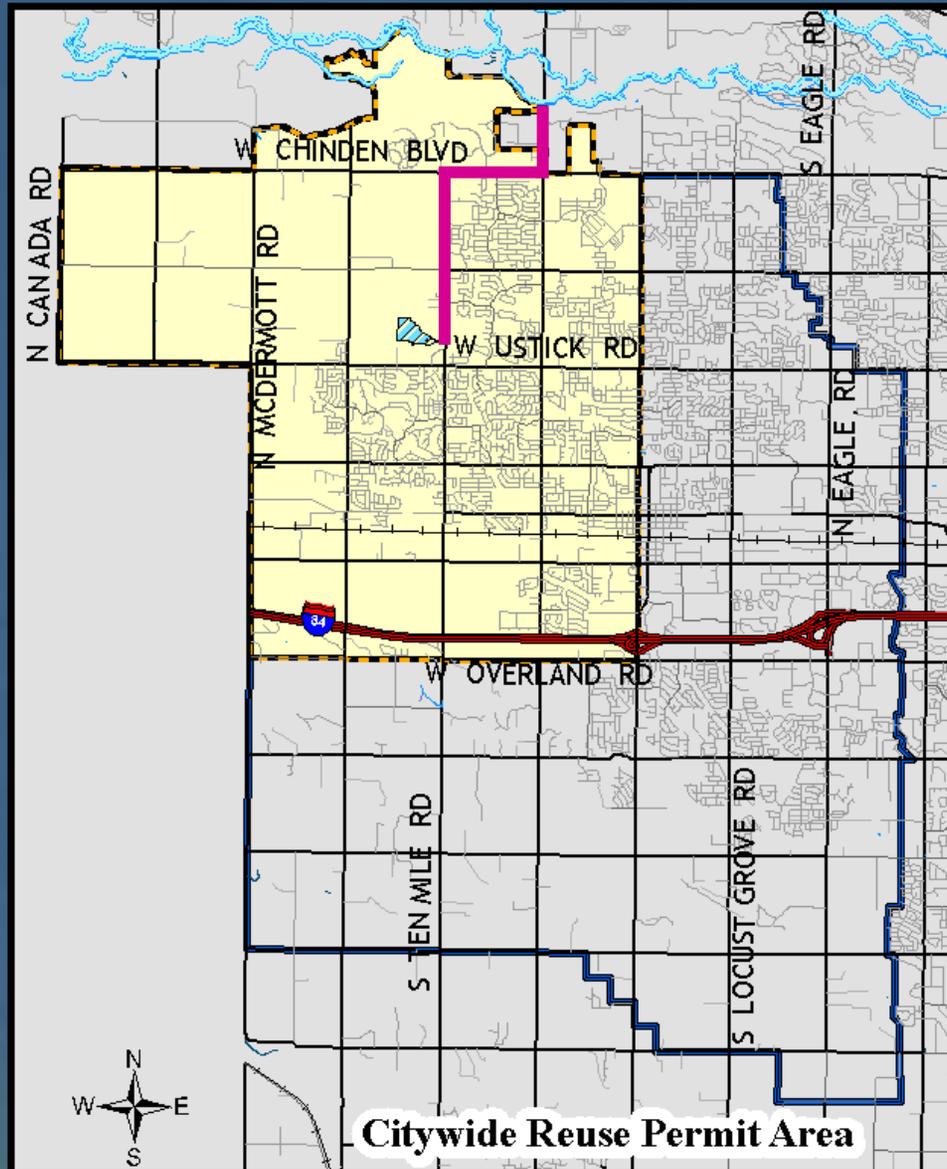
Going Citywide:

Challenges, Obstacles and Opportunities

Going Citywide: Challenges & Obstacles

Our Citywide Permit:

- Acquire Permit First
- Develop Business Plan
- Retrofit Existing Infrastructure (BRO)
- Focus on Adjacent Opportunities
 - Golf Courses
 - Parks & Open Spaces
 - Ten Mile I/C Area
- Accommodate Growing Areas
 - New Subdivisions
- Retrofit Existing Areas
 - Older Subdivisions



Going Citywide: Challenges & Obstacles

Challenges of Citywide Class A Reuse

- Operational
- Public Perception
- Infrastructure
- Logistics
- Program Funding



Going Citywide: Challenges & Obstacles

Operational

- Regulations (GW Rule)
- Constituent Limits
- Treatment/Disinfection
- Overspray of Surface Water
- Monitoring
- Liners & Nitrogen
- Supply and Demand Studies
- Point of Compliance
- Grass Clippings
- Service Interruptions



Going Citywide: Challenges & Obstacles

Public Perception



- Often a Stigma With Reuse
- Education of Public: Paramount to Success
 - Case Study: San Diego vs. Orange County
- Nomenclature “Reclaimed Water” vs. “Reclaimed Wastewater”
- Heroes Park Interpretive Plaza Showcases Reclaimed Water
- Town Hall/Open House Meetings
- Posters and Brochures for Public Events
- Advisory Committees
- Counter Fear With Facts

Total Coliform (MPN/100 ml)*

Irrigation Ditch Water	Meridian WWTP	ID Class A Requirements
2,623	185	2.2

* Mo Average for July 2007

Going Citywide: Challenges & Obstacles

Infrastructure

- Plant Modifications
- Disinfection
- Booster Stations
- Pressurized Lines
- Storage Facilities
- Mainlines and Sizing



Going Citywide: Challenges & Obstacles

Nearly 900 Acres Are Available In NW Meridian For Irrigation

Site	Area, ac
Heroes Park	20
Spurwing Golf Course	230
Foxtail Golf Course	75
Lakeview Golf Course	~140
Settlers Park	19
Tulley Park	12
Seasons Park	4
New Development*	380
TOTAL	~880

*Assumes 10% irrigable area.



Equivalent to maximum monthly demand of >5.9 MGD

Going Citywide: Challenges & Obstacles

Reclaimed Water Program Funding

- Capital Costs Financed By:
 - Grant and Loan Programs
 - Development/Redevelopment
 - Connection Fees
 - Subsidized by Wastewater Rates
 - CIDs & LIDs
- Ongoing O & M Financed By:
 - Subsidized by Wastewater Rates
 - User Fees for Residential and Commercial Use
 - Separate Reclaimed Water Utility



Going Citywide: Challenges & Obstacles

Reclaimed Water:

A Variety of Uses With a Variety of Challenges

- Urban Irrigation: Golf Courses, Parks, Schools, Residential, & Commercial
 - Overspray
 - Benches & Backyards
 - Surface Water Features
 - Irrigation System Integrity
 - Over-Nitrification (Clip. & Fert.)
 - Runoff
- Toilet Flushing
 - Drinking & Redundancy
- Industrial Processing
 - Redundancy & Backflow
- Fire Suppression
 - Backflow Prevention
- Dust Control
 - Authorized Users (city staff)



Benefits of Reuse

City of Meridian: Diving In

Realizing the Benefits of Reclaimed Water



- Reclaimed Water is a “Drought-Proof” Water Supply
- Reduce Demand on Municipal Water
- Frees Up Agricultural Water for Agricultural Uses
- Year Round Irrigation – Where Applicable
- Lower Effluent Flow to River
- Less Stringent Limits Than NPDES Permit
- Can Be More Economically and Environmentally Sustainable for WWTPs
- Right Water for the Right Use



WE ARE USING WATER WISELY



**DO NOT DRINK
FROM THE IRRIGATION SYSTEM**

CAUTION: RECLAIMED WATER IS NOT INTENDED FOR HUMAN CONSUMPTION.
ATENCIÓN: EL AGUA RECIKLADA NO ES APROPIADA PARA EL CONSUMO HUMANO.



Regulatory Perspective



Class A Reuse in Idaho

- Very high quality “Reclaimed Water” from WWTP
- Very few Class A projects in Idaho – just starting
- Meridian is first “City-wide” Class A permit

City-wide Approach (New)

- City “Zones” or quadrants used as overall management areas with percentage of land area irrigated rather than individual management units
- “Zones” based on schedule to build out city-wide distribution and 5 year permit cycles.
- Simpler for both City and DEQ to manage

Reuse Issues – Ground Water Quality

- Ground Water Quality Impact Analysis: Impact of Nitrate at down gradient area boundary determines treatment level of Total Nitrogen in Reclaimed Water
- Rules say 30 mg/L MAX – depends on Ground Water Quality Impact Analysis
- Same for recharge: 10 mg/L MAX - depends on Ground Water Quality Impact Analysis
- End of pipe compliance point

Reuse Issues for Meridian - Treatment

- Existing Activated Sludge Plant with NPDES permit
- Additional Filtration, additional Chlorination, Contact Time (or UV), Redundancy, other
- Monitoring for Total Nitrogen, Turbidity, Total Coliform, other

Reuse Issues for Meridian - Management

- Various Uses: Irrigation; toilet flushing; dust suppression; other
- Adding new sites and uses to permit
- Operations and Maintenance
- Reporting
- Potential large issues: Over spray of surface water; impact of existing irrigation sources
- All of above managed by City with minimal input from DEQ after permit is issued

What does DEQ need from a City to start permit process? (1)

- Read the reuse rules and wastewater rules front to back 3 or 4 times, both City and Consultant
- Read the ground water quality rule
- Come up with a concept of what you want to do with your city
- Set up a meeting with DEQ Regional Office to discuss application process and requirements and timing

What does DEQ need from a City to start permit process? (2)

- Reuse Engineering Report (reuse rules)
- Facility Plan for treatment and distribution facilities (wastewater rules)
- Preliminary Engineering Report for treatment and distribution facilities (wastewater rules)
- Ground Water Impact Analysis
- Total Nitrogen data from WWTP effluent
- Technical, Financial and Managerial Plan
- Licensed Operator for WWTP
- Lots of other stuff – read the rules again

Technical Issues

Class A Reclaimed Water

- Uses - irrigation parks, open spaces, residential lawns, roadside landscaping, groundwater recharge, fire suppression, dust suppression, toilet flushing (IDAPA 58.01.17.07a).
- The City of Meridian,is hereby authorized to construct, install, and operate a wastewater reuse system in accordance with the wastewater reuse rules (IDAPA 58.01.17) and wastewater rules (IDAPA 58.01.16), the groundwater quality rule (IDAPA 58.01.11)...

Groundwater Quality Rule

- The policy of the state of Idaho is that existing and projected future beneficial uses of ground water shall be maintained and protected, and degradation that would impair existing and projected future beneficial uses of ground water and interconnected surface water shall not be allowed.

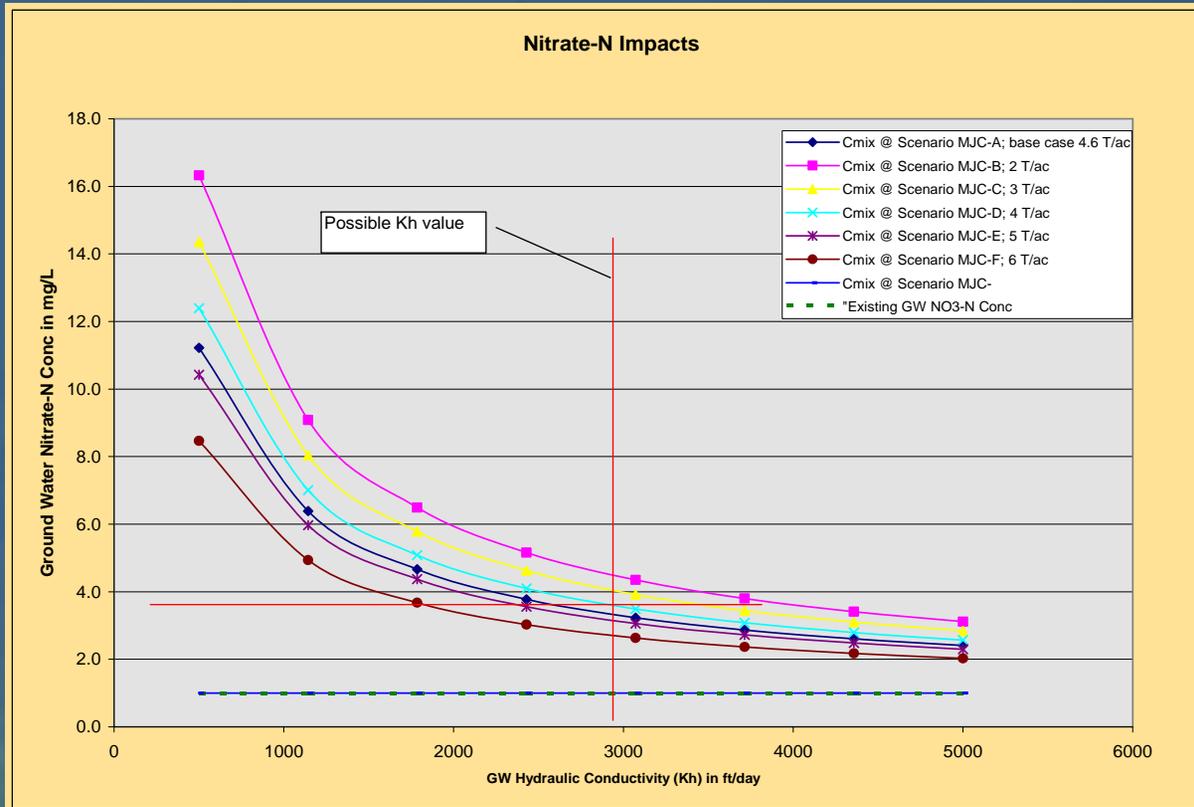
Approach to Citywide Permit:

- Develop a permit based on a Total Nitrogen concentration that is protective of groundwater under conservative (yet reasonable) assumptions.



Approach for Establishing TN Limits

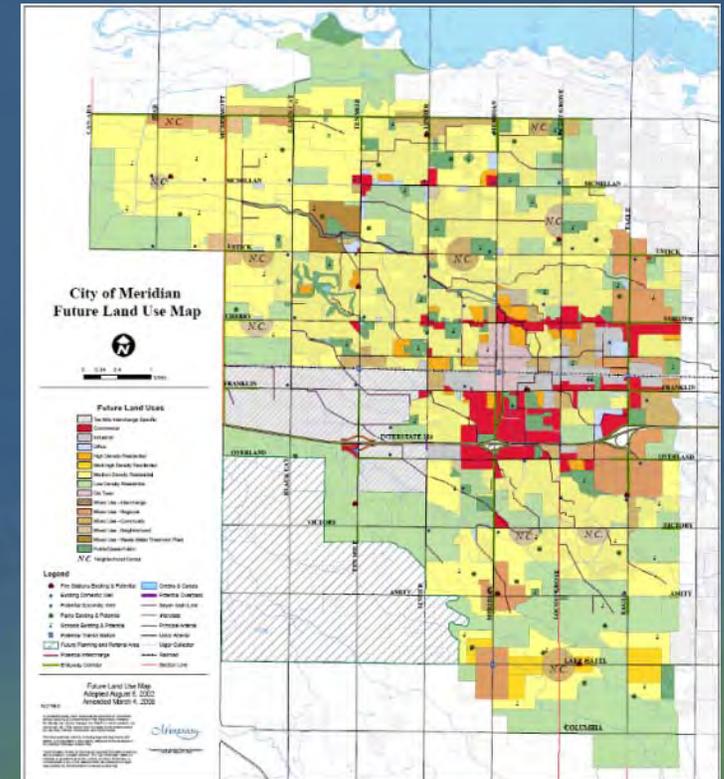
- Employ IDEQ's Nutrient and Hydraulic Balance Module & Groundwater Mixing Zone Module



Citywide Approach for Groundwater Assessment

Potential Reuse Areas for Planning Purposes	Acres
Parks	84
School (recreation areas)	68
Golf courses	230
Residential developments	654
Interchange landscaping	<u>50</u>
Total	1,086

The overall acreage of this area is 13,142 acres



Nutrient and Hydraulic Balance Model

- Turf Grass
- Clipping not removed
- Over-application of water – leach 5 in. of reclaimed water to groundwater
- Wet spring conditions
- 30 to 60 lbs N/acre leached to groundwater

Groundwater Mixing Zone

- Nitrate-N Priority area – used IDEQ/USGS data for upgradient estimate 5.8 mg/L
- K values 10 to 500 ft/day
- Criteria: less than 1 mg/L increase nitrate-N at point of compliance (downgradient of permit area)

Results

Reclaimed Water Average Total N (mg/L)	N Loading (lbs N/acre)	Leaching Volume (ac-in/ac)	Change in Groundwater Nitrate-N (mg/L)
15.2	165	5.08	1.0

Analysis under review by IDEQ



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