Water Use Snapshot

- 40% Residential - Outdoor Watering
- 25% Residential - Indoor
- 13% Industrial
- 11% Commercial
- 11% Non-Revenue Water
Project Objectives

- Support and embrace economic development, industrial growth, and conservation-minded consumptive uses of water
- Improve quality of life for residents
- Expand the City’s water portfolio
- Lay the groundwork for future specific reuse project considerations and implementation opportunities
Project Objective

Garden City

- Indirect Potable Reuse
- Irrigation (Municipal and Agricultural)
- Livestock Watering
- Constructed Wetland / Storage Basin
- Direct Potable Reuse
- Industrial
Sources of Potential Reuse

Dairy Farmers of America

- Estimated flows of 0.6 to 1.0 MGD
- Effluent water quality is unknown at this time except that they will meet the NPDES permit requirements.

City Wastewater Effluent

- 2.5 MGD effluent flow rate (average).
- Wheatland may take up to 2.0 MGD until 2025
- Known water quality
City WWTP Process Flow Diagram

INFLUENT PUMP STATION → HEAD WORKS → ANAEROBIC TANKS → ANOXIC ZONE → ACTIVATED SLUDGE BASINS → OXIDATION DITCH 2 → NITRIFICATION → OXIDATION DITCH 1 → TO FLOW SPLITTER BOX

FLOW SPLITTER BOX → CLARIFIERS

CLARIFIERS → METER VAULT → UV DISINFECTION → EFFLUENT BOX → OUTFALL
DFA Facility Process Flow Diagram

1. DUPLEX BASEKT SCREEN
2. DENITE/BIO-P TANK
3. AERATION TANK
4. MBR TANK
5. TO MBR EFFLUENT TANK

6. MBR EFFLUENT TANK
7. UV DISINFECTION
8. MAG METER
9. TO GARDEN CITY OUTFALL OR HOLDING POND
Regulatory Overview
Water Uses and Demands

Garden City

- Indirect Potable Reuse
- Irrigation (Municipal and Agricultural)
- Livestock Watering
- Constructed Wetland / Storage Basin
- Industrial
- Direct Potable Reuse
Garden City Aerial View
Treatment Requirements

- Industrial
  - Based on end user

- Irrigation
  - Low potential for human contact: disinfection
  - High potential for human contact: filtration and disinfection

- Impoundments
  - No specific KDHE requirements
  - California requirements

- Direct and Indirect Potable Reuse
<table>
<thead>
<tr>
<th>Reuse Type</th>
<th>Example</th>
<th>Treatment Improvements Required per KDHE</th>
<th>Improvements Required per CATitle 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation: Low probability of human contact</td>
<td>Crop and pasture land (crops not for direct human consumption)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Golf courses, public parks, cemeteries, commercial properties, or athletic fields with irrigation during restricted public access hours</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Irrigation: High probability of human contact</td>
<td>Athletic fields, highway rest areas, freeway landscaping, public parks</td>
<td>None</td>
<td>Possible improvements to disinfection</td>
</tr>
<tr>
<td></td>
<td>Food crops (including edible root crops where recycled water contacts edible portion), unrestricted access parks and playgrounds, school yards, residential landscaping and golf courses</td>
<td>Case-by-case</td>
<td>Coagulation and filtration or membrane filtration; improvements to disinfection; turbidity monitoring</td>
</tr>
<tr>
<td>Impoundments: Low probability of human contact</td>
<td>Restricted recreational impoundments, such as fishing, boating and other non-body-contact water recreational activities, golf course hazards, landscape impoundment without decorative fountains</td>
<td>Case-by-case</td>
<td>Possible improvements to disinfection</td>
</tr>
<tr>
<td>Impoundments: High Probability of human contact</td>
<td>Recreational lakes, water features accessible to the public, fishing ponds</td>
<td>Case-by-case</td>
<td>Filtration and improvements to disinfection</td>
</tr>
<tr>
<td>Environmental Impoundments</td>
<td>Constructed wetland, enhance natural wetlands, stream flow augmentation</td>
<td>Case-by-case</td>
<td>Filtration and improvements to disinfection</td>
</tr>
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<tr>
<td>Industrial Reuse: Low probability of human contact</td>
<td>Industrial boiler feed, cooling tower or air conditioning, backfill consolidation around nonpotable pipelines, mixing concrete, bottle or container cleaning or conveying, industrial process water not in contact with workers</td>
<td>Case-by-case</td>
<td>None</td>
</tr>
<tr>
<td>Industrial Reuse: High probability of human contact</td>
<td>Industrial or commercial cooling or air conditioning with cooling tower, evaporative condenser, spraying or mist mechanism</td>
<td>Case-by-case</td>
<td>Turbidity monitoring</td>
</tr>
<tr>
<td>Indirect Potable Reuse</td>
<td>Groundwater/aquifer recharge, discharge to surface water supplies</td>
<td>Case-by-case</td>
<td>None</td>
</tr>
<tr>
<td>Direct Potable Reuse</td>
<td>Pipeline from wastewater treatment plant effluent to water treatment plant influent</td>
<td>Case-by-case</td>
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</tr>
</tbody>
</table>
PHASE 1 • AGRICULTURAL

PHASE 2 • PARK COMPLEX

PHASE 3 • GOLF COURSE

PHASE 4 • SOCCER COMPLEX

PHASE 5 • POTABLE REUSE

Economic Growth

Population Growth

Promote A Of Conservation

WASTEWATER REUSE

Garden City

Indirect Potable Reuse

Direct Potable Reuse

Irrigation (Municipal and Agricultural)

Livestock Watering

 Constructed Wetland / Storage Basin
Special thanks to the City of Garden City

Fred Jones
Water Resource Manager