

City of San Diego Water Reuse Study

**Natural Resources
and Cultural Committee
September 27, 2006**



Local solutions to our long-term water needs

Water Reuse Study

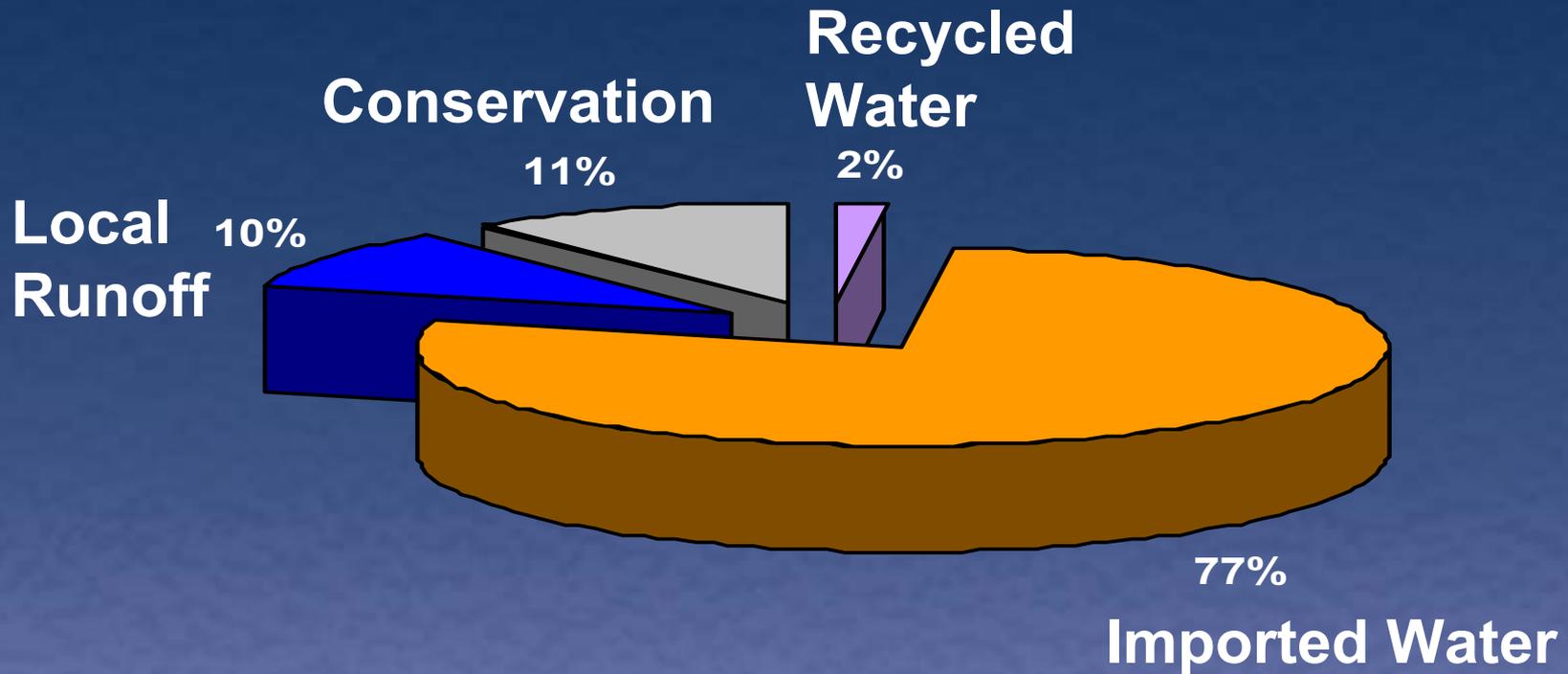
On January 13, 2004, the San Diego City Council authorized a study by the Water Department to evaluate all opportunities to increase recycled water use in the City. All options will be presented in the final report at the study conclusion.

Objective

Conduct an impartial, balanced, comprehensive, science-based study of all recycled water opportunities so the City of San Diego can meet current and future water supply needs.



The City's Current Water Supply



2005

Recycled Water Master Plan Update



- A separate pipeline system (dual piping) is used for distribution and color-coded purple
- The Recycled Water Master Plan Update 2005 was combined with the Water Reuse Study effort
- The Master Plan analyzes supplying water to current and future customers for irrigation and industrial use (non-potable use)

**North City
Water Reclamation Plant
Opened 1997**

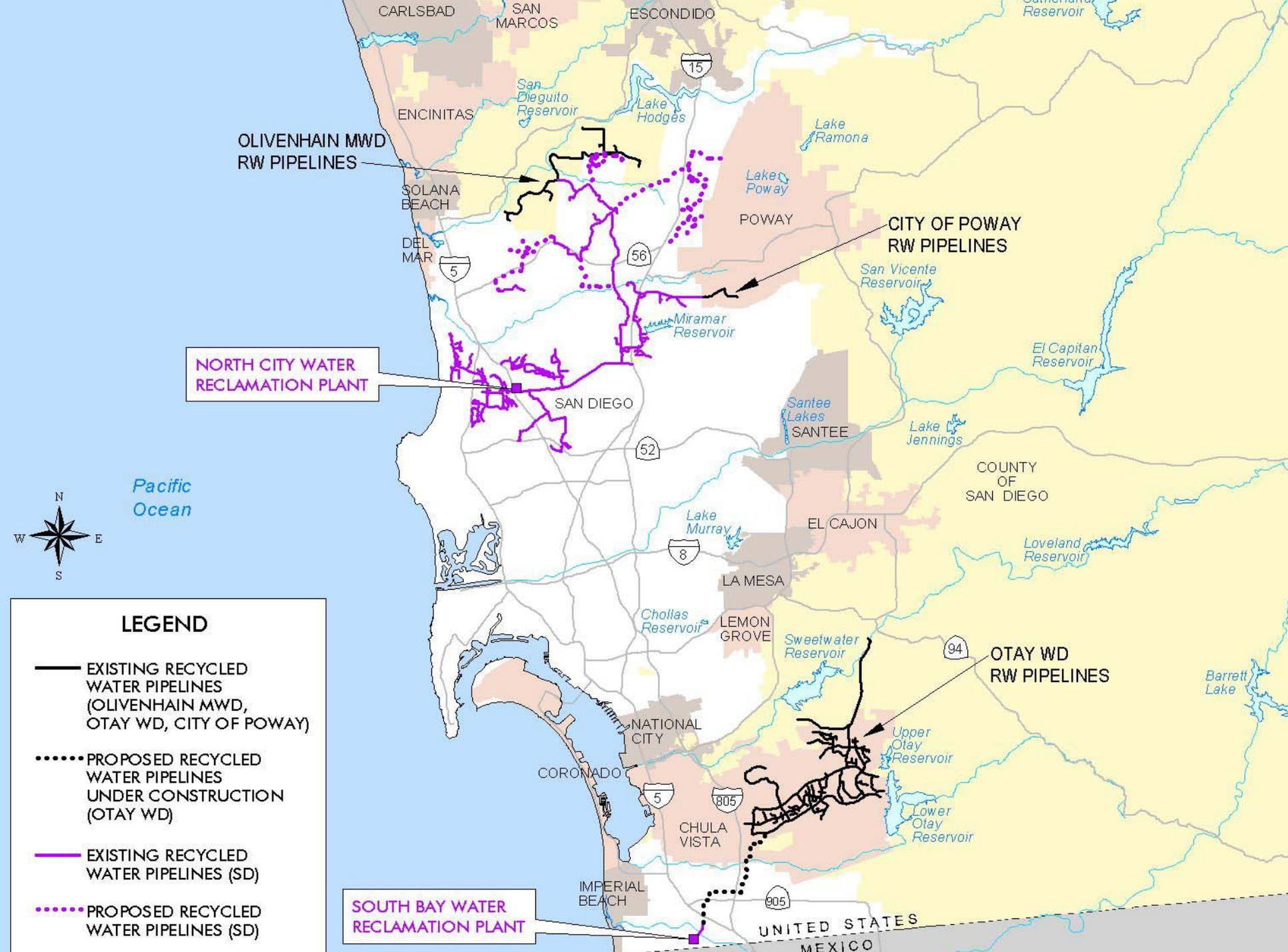


**Design capacity 30 MGD
24 MGD available for distribution
after plant processing use**

**South Bay
Water Reclamation Plant
Opened 2002**



**Design capacity 15 MGD
13.5 MGD available for distribution
after plant processing use**



Water Reuse Options Identified by City Council

- Continue expanding the system for irrigation and industrial customers
- Create storage reservoirs
- Add to streams or create wetlands
- Recharge, improve or protect groundwater basins

Indirect potable reuse options

- Add to groundwater basins used for drinking water supplies *
- Reservoir augmentation*

* Indirect potable reuse options require advanced water treatment to the recycled water

Graywater use also evaluated in the Water Reuse Study

Evaluation Criteria for Water Reuse Options

- Health and Safety
- Social Value
- Environmental Value
- Local Water Reliability
- Water Quality
- Operational Reliability
- Cost
- Ability to Implement



City Irrigation customer

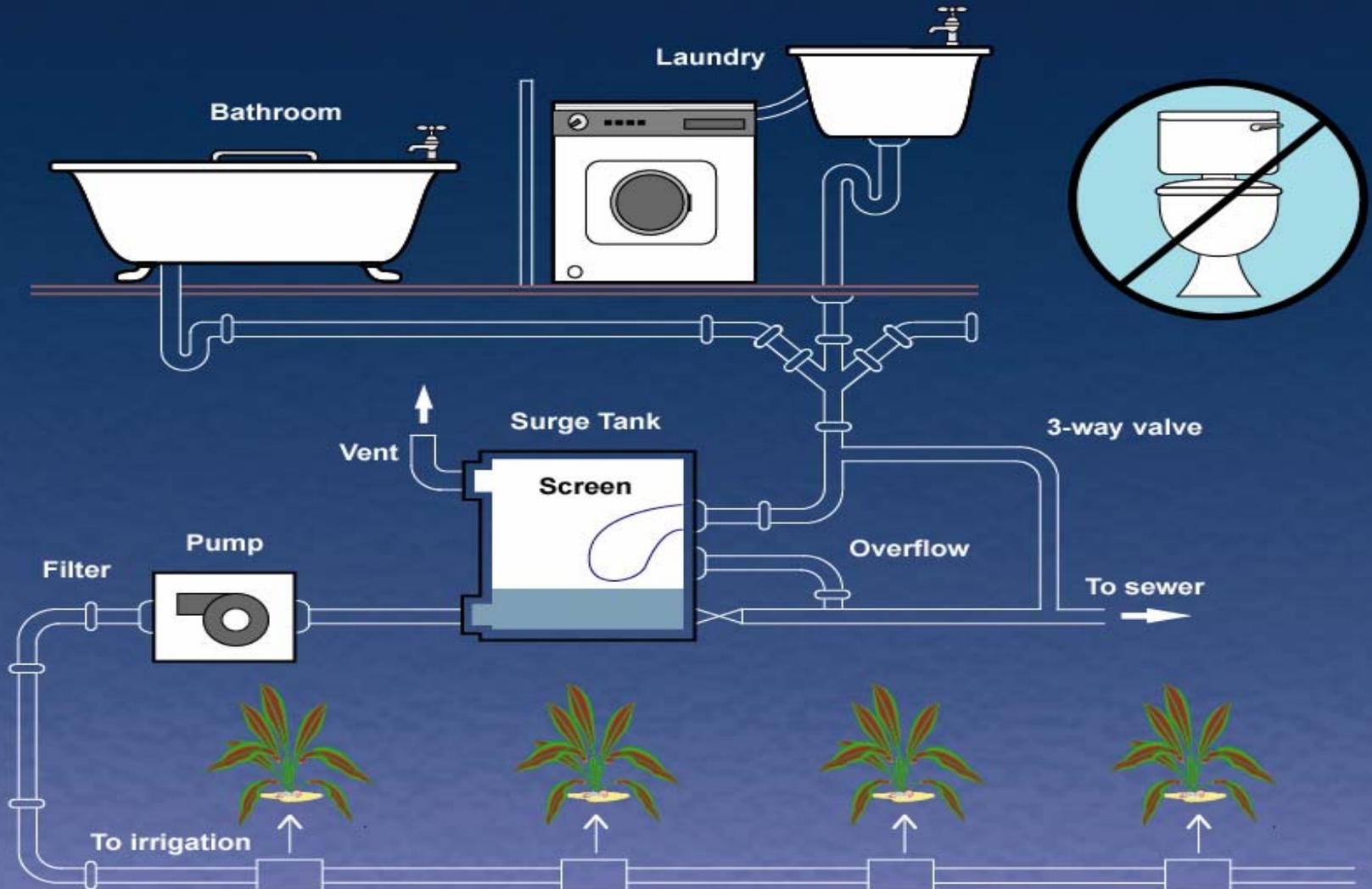
Options refined and approved by Study's stakeholder group

Study Analyzed Graywater Use



- Graywater is wastewater from bathroom sinks, tubs, washing machines in homes and businesses (cannot be from kitchen sinks, dishwashers or toilets)
- Like recycled water, it saves valuable water resources
- Permits required by local health agency
- Must be used on-site for underground irrigation systems

Graywater Systems



Public Involvement Activities*



- Two American Assembly style workshops

* Statistics as of March 31, 2006

- 135 speaking engagements
- 6,933 Web site visits
- 27 stakeholder interviews
- 432 on-line surveys
- Telephone survey
- Monthly e-newsletters
- Educational video shown on City TV
- 67-member stakeholder group

67-Member Stakeholder Group American Assembly-style Workshops October 2004 and July 2005

- “The Assembly believes the (Study) provides a useful and appropriate analysis of reuse strategies...to inform policy-makers.”
- “...unanimously agrees that current technology and scientific studies support the safe implementation of non-potable and indirect potable use projects.”



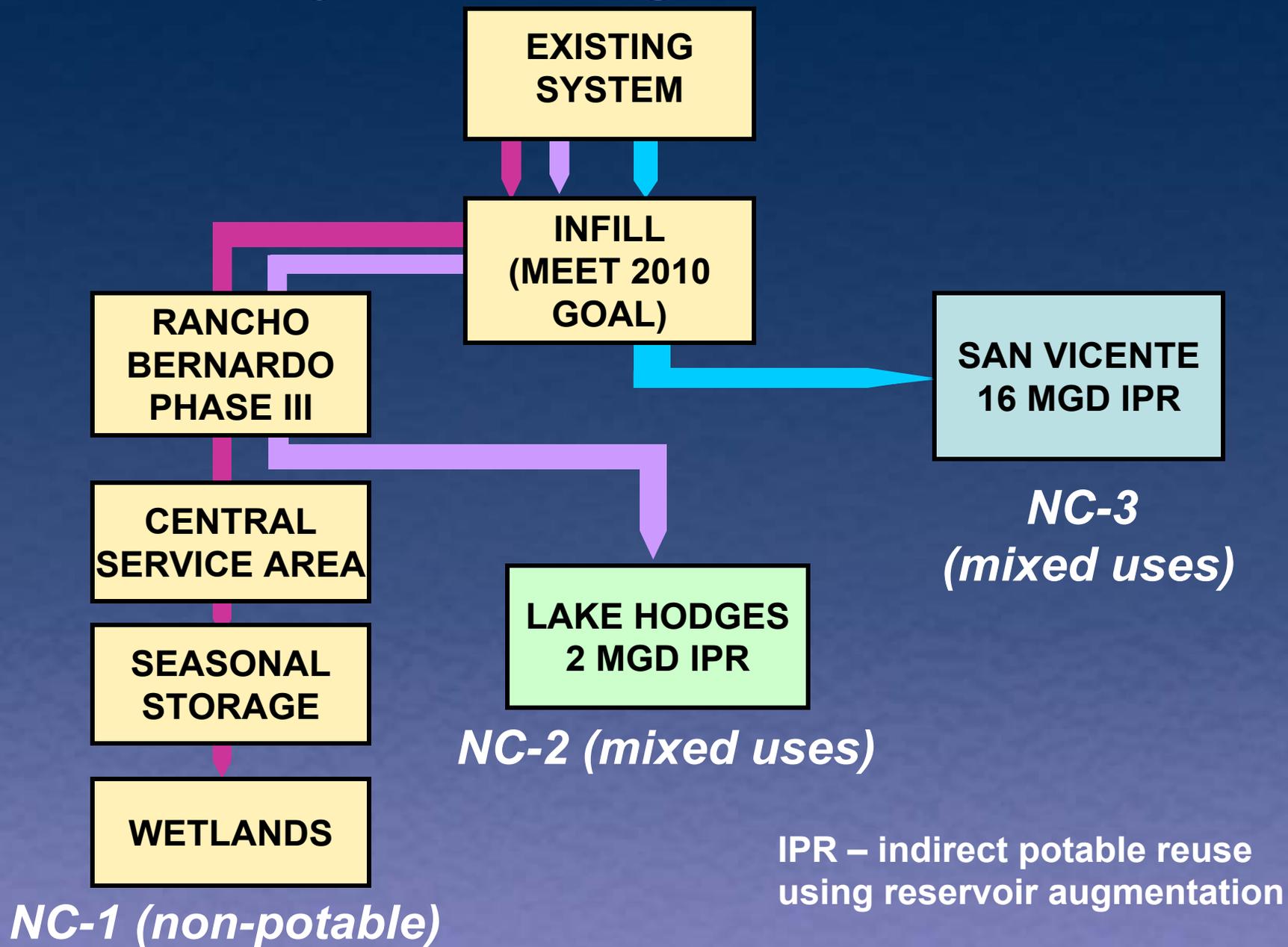
Technical Review of Study Work by Independent Advisory Panel

- Panel formed to provide independent third-party review of Study process, science, technical research and reuse opportunities
- National Water Research Institute selected ten panelists, plus one community member
- Distinguished experts in water treatment, public health, engineering and water regulations
- Issued Statement of Findings Dec. 1, 2005

Water Reuse Strategies Identified in the Report

- Three for each water reclamation plant
- Strategies identified non-potable uses, strategies that maximized plant capacity, and strategies that provided a mixture of these
- Strategies were reviewed by the Study's stakeholder group at July 2005 workshop
- Options for groundwater basin recharge or groundwater basin indirect potable reuse face significant hurdles

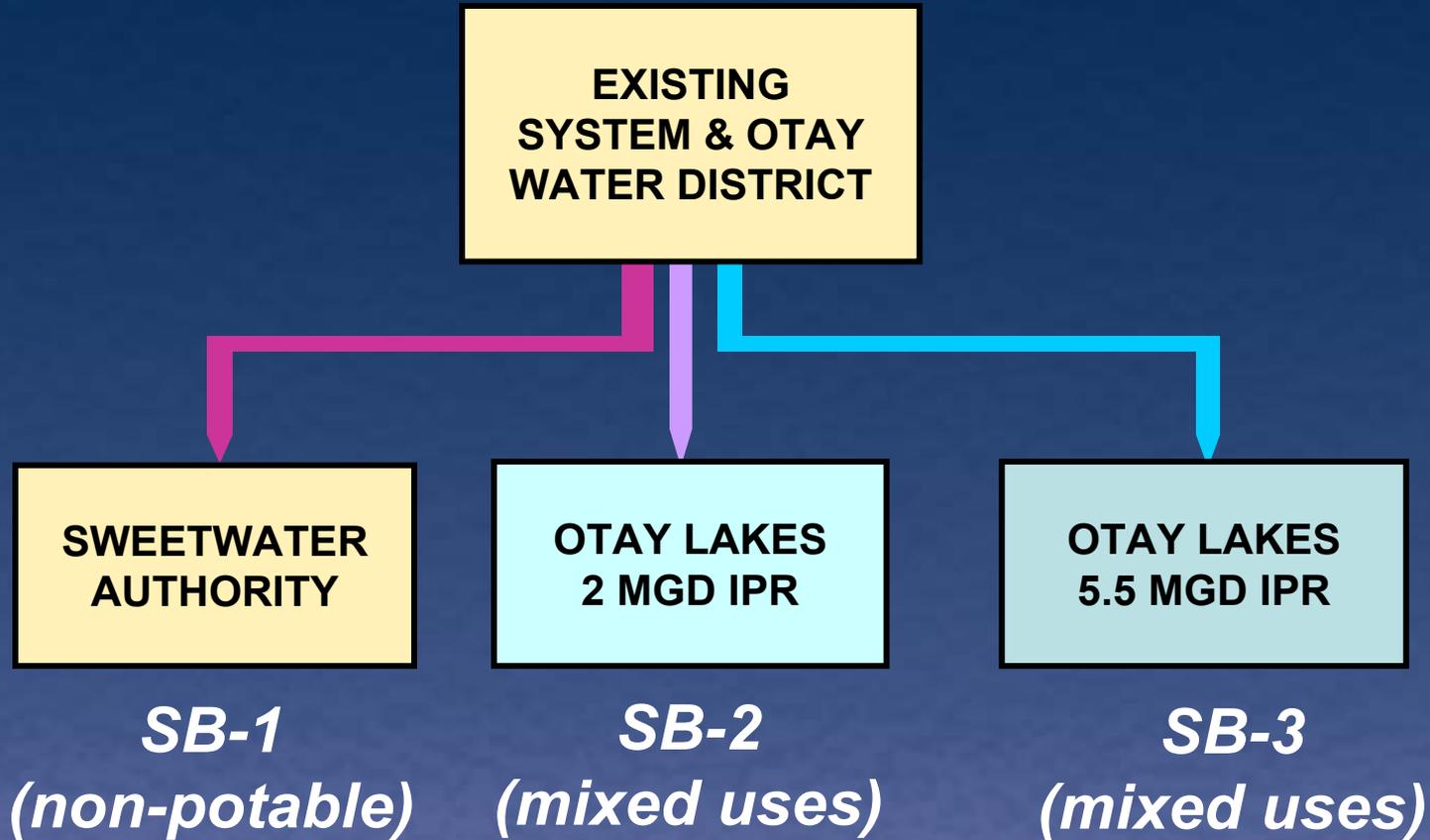
North City Strategies Flow Chart



North City Reclamation Plant Recycled Water Use by Strategy

Strategy	Reuse (Million gallons per day)	Plant Capacity Used	Estimated Monthly Water Bill Average Increase
NC-1 (non-potable)	17.6	73%	\$2.34
NC-2 (mixed uses Lake Hodges)	16.1	69%	\$1.17
NC-3 (mixed uses San Vicente)	21.2	100%	\$1.63

South Bay Strategies Flow Chart



IPR – indirect potable reuse using reservoir augmentation

South Bay Reclamation Plant Recycled Water Use by Strategy

Strategy	Reuse (Million gallons per day)	Plant Capacity Used	Estimated Monthly Water Bill Average Increase
SB-1 (non-potable)	11.6	86%	\$0.00*
SB-2 (mixed uses Otay Lakes)	8.0	62%	\$0.23
SB-3 (mixed uses Otay Lakes)	11.3	96%	\$0.89

* sales to other agencies have minimal
infrastructure costs to the City

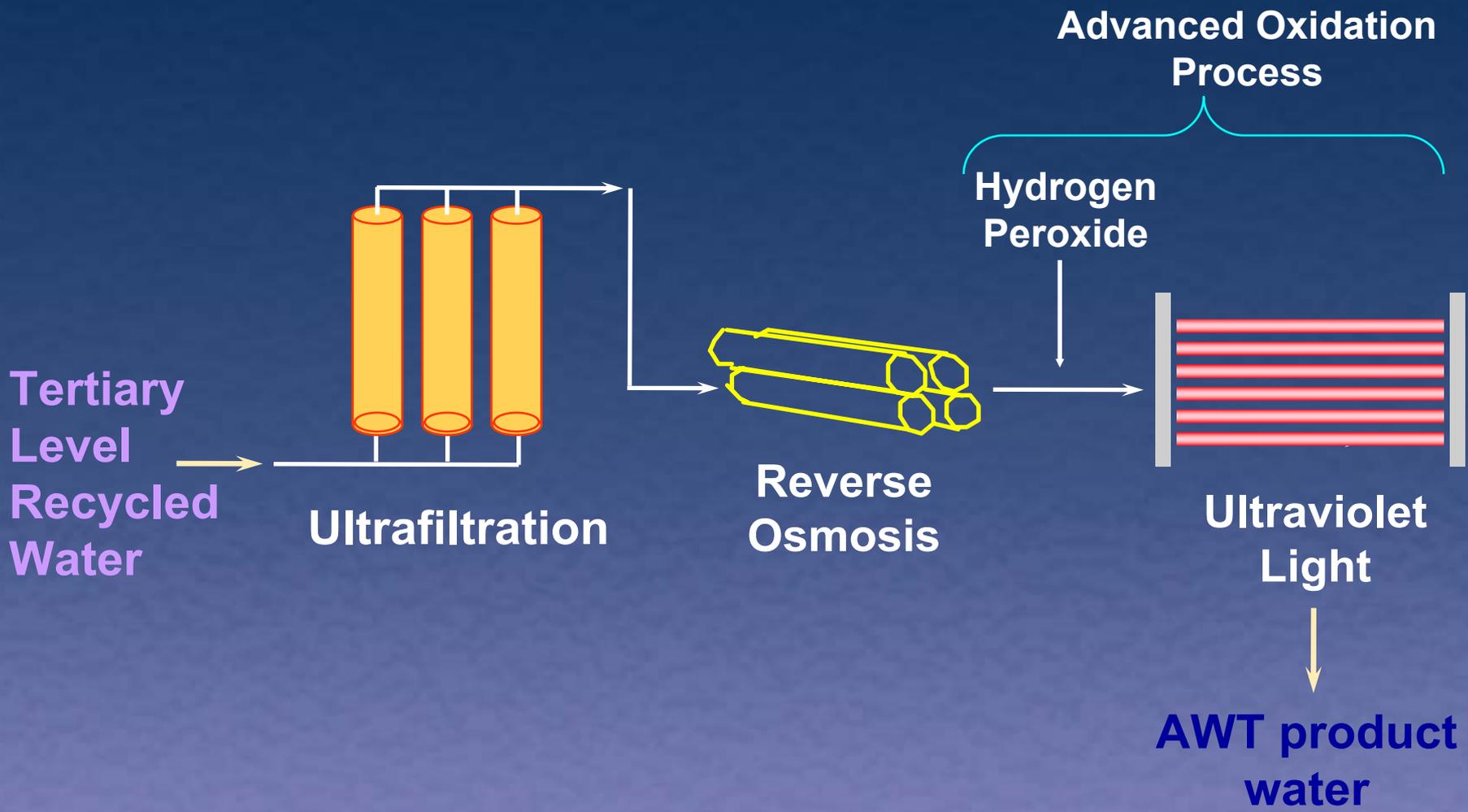
**Water Quality Research
Studies Related to
Indirect Potable Reuse
Options**

Advanced Water Treatment Three-Step Process

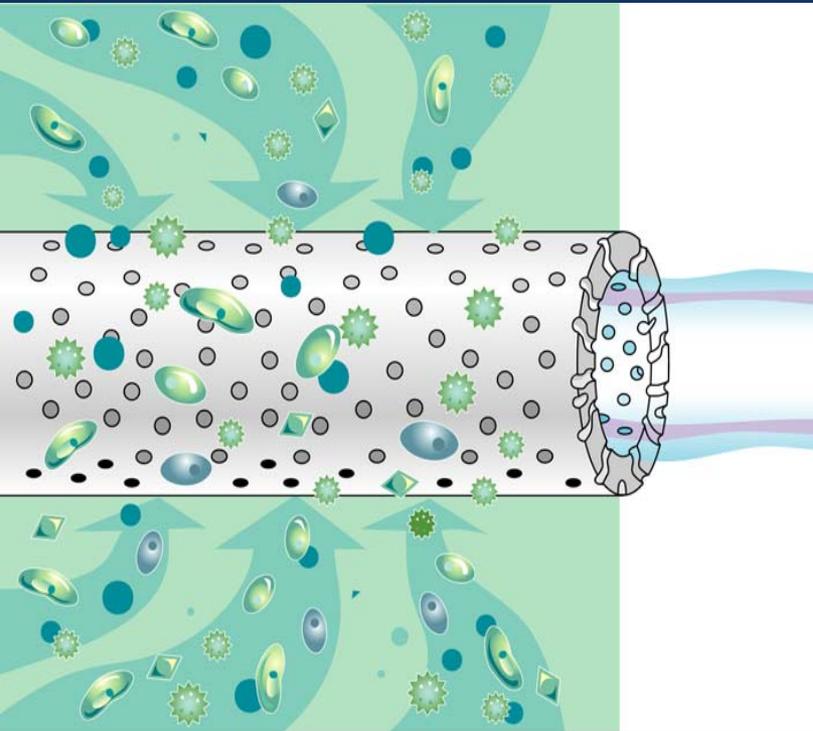


Advanced water treatment (AWT) research facility at the North City Water Reclamation Plant

Advanced Water Treatment Steps



Step One: Ultrafiltration



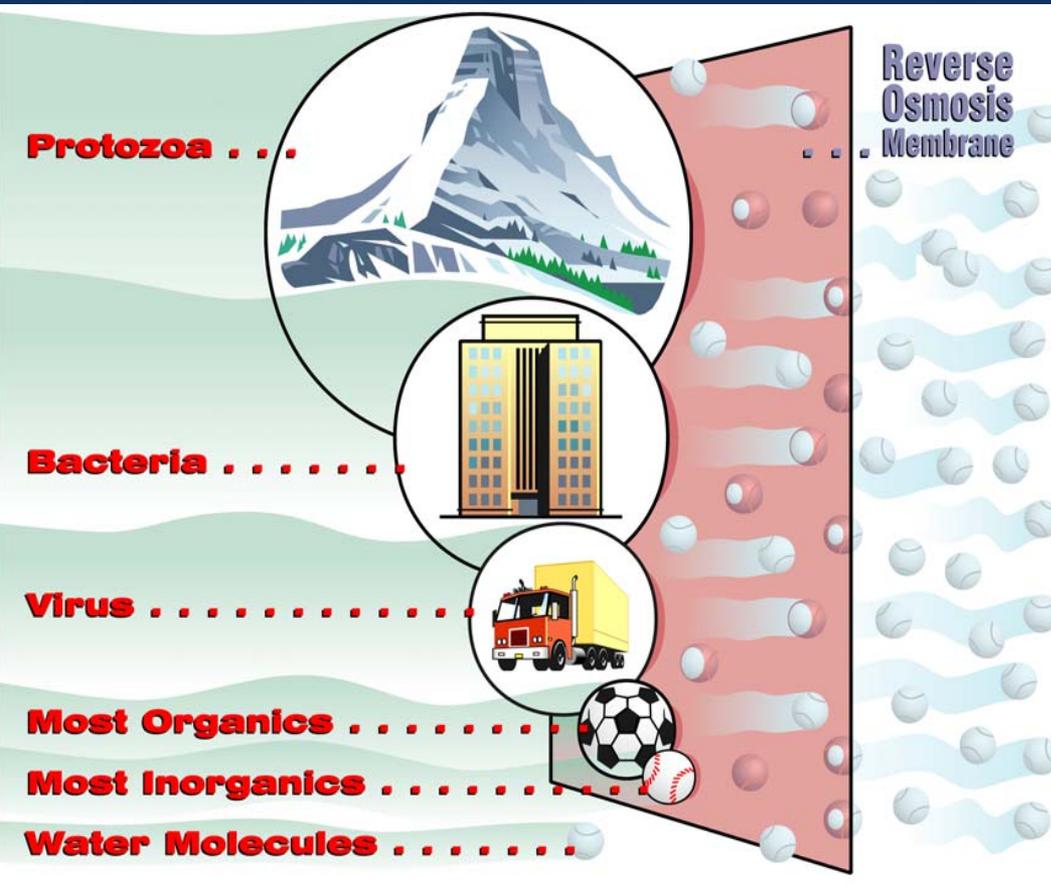
Ultrafiltration (UF)

- Like a hollow straw with holes in the sides
- Filters out particles larger than $1/3,000$ the diameter of a human hair
- Used to make baby food, purify medicines, fruit juices and other uses

Step Two: Reverse Osmosis

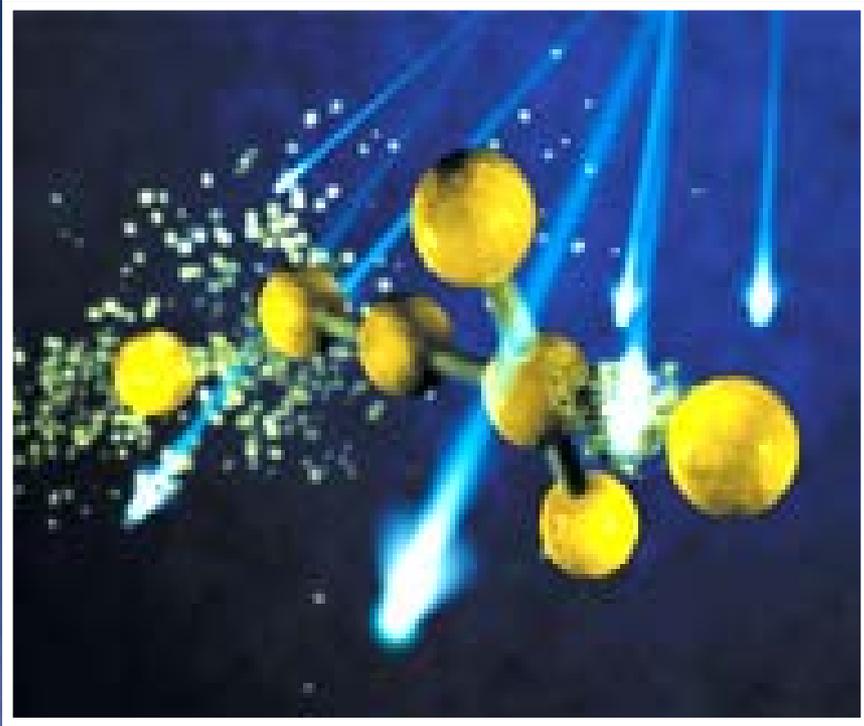
➤ Water is directed under high pressure through thin membranes. Same technology used by:

- bottled water companies
- ocean water desalination facilities
- Brackish groundwater desalination facilities
- U.S. military to purify water for drinking by personnel in Iraq and for victims in disaster areas



Reverse Osmosis (RO)

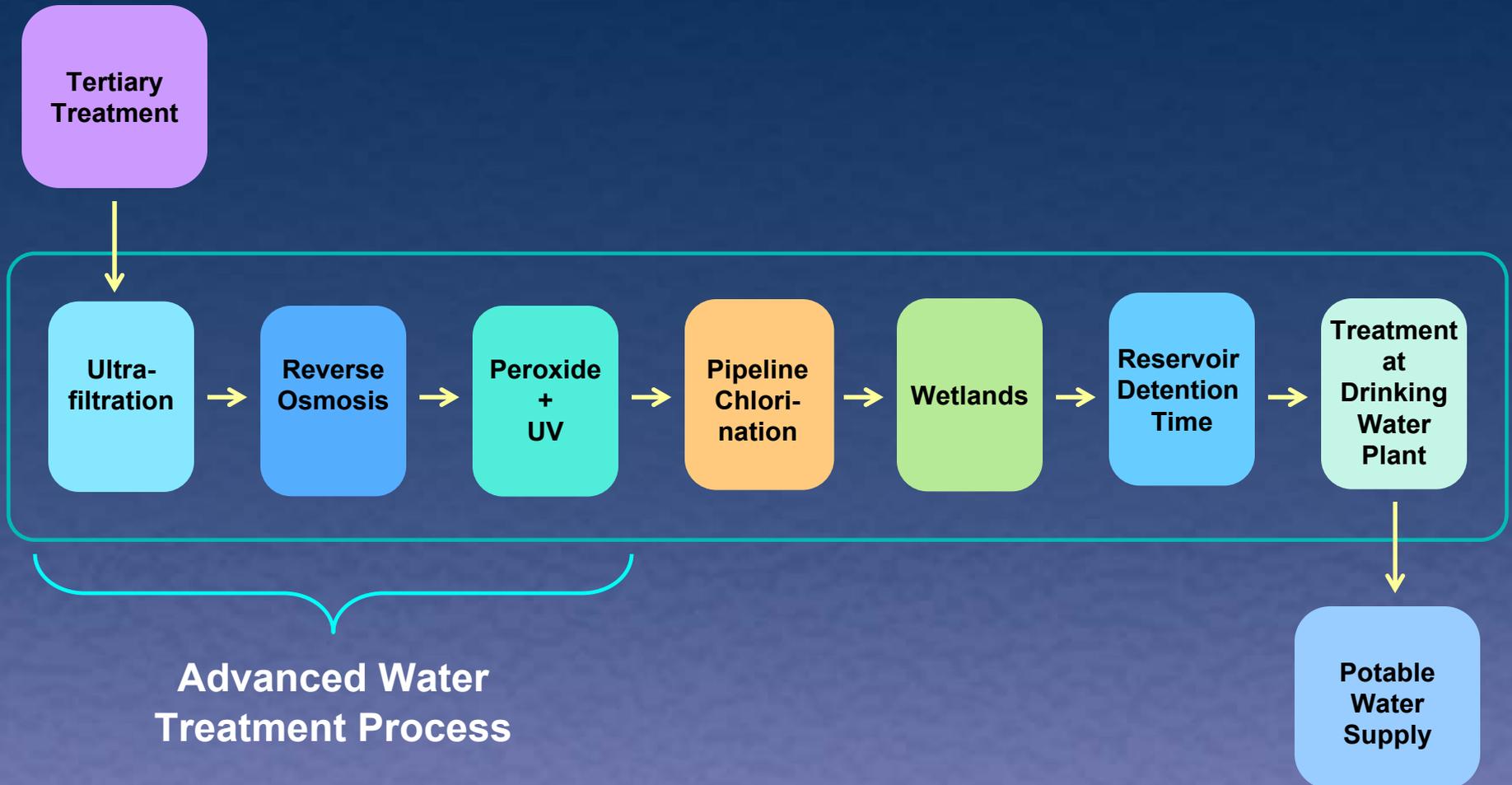
Step Three: Advanced Oxidation



Hydrogen peroxide (H_2O_2) plus ultraviolet light (UV)

- Ultraviolet light is similar to concentrated sunlight
- UV light breaks apart remaining contaminants, (if any)
- Hydrogen peroxide oxidizes remaining contaminants, (if any)
- UV light is used to disinfect medical and dental instruments

Multiple Barrier Approach



Water Quality Research Results

Advanced Water Treatment Process

- Advanced treated water (AWT) met all federal and state drinking water standards
- AWT process eliminated unregulated contaminants of concern to below notification levels
- AWT process removed endocrine disrupting compounds, pharmaceuticals and personal care products to below detection limits

Final Study Draft Report available on Web site



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