Inland Empire Utilities Agency

Asset Management Plan

Fiscal Year 2015/16

Inland Empire Utilities Agency

A MUNICIPAL WATER DISTRICT

Acknowledgments

This Asset Management Plan was developed by staff members of the Inland Empire Utilities Agency. The Agency gratefully acknowledges the important contributions of the authors of the various sections of this plan. In particular, the authors of the Asset Management System Summaries put forth a great deal of effort to develop system summaries that are proving to be a valuable tool in guiding asset management decisions.

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Executive Summary

The Inland Empire Utilities Agency is committed to providing services for its rate payers to reliably meet the business goals approved by the Agency's Board of Directors. This commitment requires the Agency to diligently and carefully manage their assets. Through asset management, the Agency can coordinate decisions and take actions that allow them to meet these business goals at the lowest lifecycle cost.

This Asset Management Plan is intended to be a useful document for those who have a deep understanding of the Agency as well as for those who are only somewhat familiar with it. To meet the needs of both audiences, this plan contains introductory and overview chapters on the Agency's function, service area, business goals, and future growth (Chapters 1 – 4) as well as more detailed information on the Agency's asset valuation, financial projections, and physical assets (Chapters 5 – 7).

The current values for Agency assets are $845 million for replacement and $534 million for depreciation. The various components of these values are summarized in Table 5-1.

The Long-Range Plan of Finance (LRPF) aligns the Agency's financial capacity with long-term service objectives. The LRPF uses forecasts to provide insight into the Agency's future financial capacity so that Agency strategies can achieve long-term sustainability of financial and service objectives. Development of the LRPF is ongoing, with a complete robust and dynamic LRPF model anticipated in summer 2015. Some of the proposed features of the new financial model include extending the scope from 10 to 50 years, execution of multiple "what if" scenarios to highlight the effect of certain variables, and on-screen graphic presentations to more effectively communicate the alternatives and outcomes.

The Agency's physical assets are described in Chapter 7, Asset Management System Summaries, where they are organized according to the following systems:

1. Regional Water Recycling Plant No. 1 (RP-1)
2. Regional Water Recycling Plant No. 2 (RP-2)
3. Carbon Canyon Water Recycling Facility (CCWRF)
4. Regional Water Recycling Plant No. 4 (RP-4)
5. Regional Water Recycling Plant No. 5 (RP-5)
6. Recycled Water Distribution (RW) & Ground Water Recharge (GWR) Systems
7. Inland Empire Regional Composting Facility (IERCF)
8. Agency Lift Stations (LS)
9. Regional Conveyance System (RC)
10. Agency Laboratory (Lab)
11. Agency Headquarters (HQ)
12. Business (BIZ) & Process Automation Control (PAC) Networks

Each system summary comprises six sections: an asset profile, a capacity profile, an asset rating, key issues, history of key assets, and potential projects. Of particular note is that the system summaries identify both existing and potential projects to address needed rehabilitation, replacement, and upgrades to assets. As such, these summaries provide key information for budgeting and project planning.

1. Introduction

1.1. Purpose of the Asset Management Plan

The Asset Management Plan presents the physical assets of the Inland Empire Utilities Agency and discusses the funding required to manage these assets to deliver the services expected by customers.

1.2. Full Economic Cost of Infrastructure Service Delivery

The cost of providing infrastructure services depends on the standard, or level of service, required by the Agency and the community. The Agency must show the full cost of providing that level of service so that they can set a realistic level of service based on customer expectations and appropriate service fees. The cost of infrastructure asset services is a function of the lifecycle costs and the current position of the asset in the asset lifecycle, as shown in Figure 1-1.

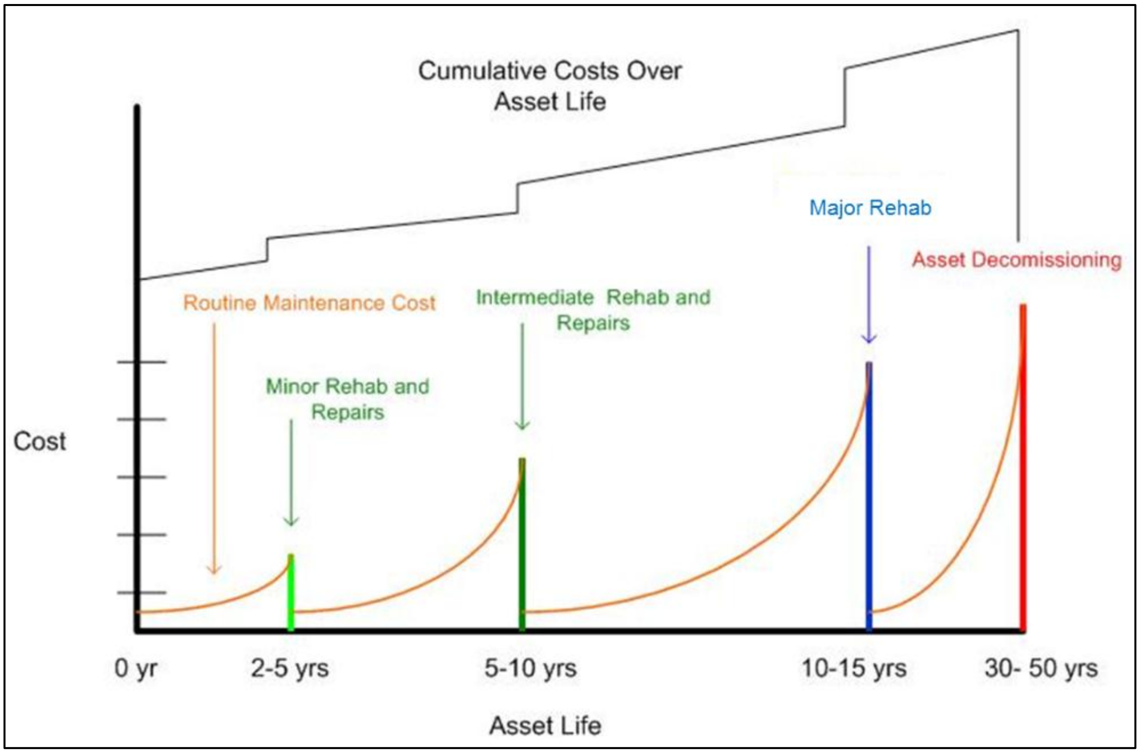

Figure 1-1: Lifecycle Cost

The Agency is better able to make decisions when they consider the lifecycle cost of assets. If costs increase in one area, then a suitable reduction or trade-off must be reflected in another area. For example, in order for the Agency to reduce operating and maintenance cost or business risk exposure, they can either invest capital or improve the offered levels of service.

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2. Inland Empire Utilities Agency Overview

2.1. Service Area

The Inland Empire Utilities Agency is a regional wastewater treatment and water agency that provides sewage treatment, biosolids handling, and recycled water to the west end of San Bernardino county. Its 242-square-mile service area includes the cities of Upland, Montclair, Ontario, Fontana, Chino, Chino Hills; the Cucamonga Valley Water District, which services the City of Rancho Cucamonga; and the unincorporated areas of San Bernardino County, including the Chino Agricultural Preserve.

The Agency, a special assessment district, is governed by a five-seat publicly elected Board of Directors. Each director is assigned to one of the five divisions: Division 1 – Upland/Montclair; Division 2 – Ontario/Agricultural Preserve; Division 3 – Chino/ Chino Hills; Division 4 – Fontana; Division 5 – Rancho Cucamonga. The regional technical and policy committees provide information on technical and policy issues and include representatives from each of the contracting agencies.

Five regional water recycling plants are used to treat raw wastewater from the Agency's service area: Regional Water Recycling Plant No. 1 (RP-1), located in the City of Ontario; Regional Water Recycling Plant No. 2 (RP-2), located in the City of Chino; Regional Water Recycling Plant No. 4 (RP-4), located in the City of Rancho Cucamonga; Carbon Canyon Water Recycling Facility (CCWRF), located in the City of Chino; and Regional Water Recycling Plant No. 5 (RP-5), located in the City of Chino.

The Agency has two main service areas: Northern Service Area and Southern Service Area. The area north of Riverside Drive in Ontario is referred to as the Northern Service Area, and the area south of Riverside Drive is the Southern Service Area. The Northern Service Area is about 162 square miles and has two active treatment plants, RP-1 and RP-4, and one decommissioned treatment plant, RP-3. The Southern Service Area has CCWRF, RP-2, RP-5, and the Agency's Administration Headquarters, certified by *Leadership in Energy & Environmental Design*.

Along with these facilities, the Agency maintains and operates a desalter facility in the City of Chino (Chino I Desalter) on behalf of the Chino Basin Desalter Authority and a biosolids composting facility in the City of Rancho Cucamonga (Inland Empire Composting Facility) on behalf of the Inland Empire Regional Composting Authority. The Agency is also the representative of the Metropolitan Water District of Southern California for the contracting agencies. Figure 2-1 shows the Agency service area.

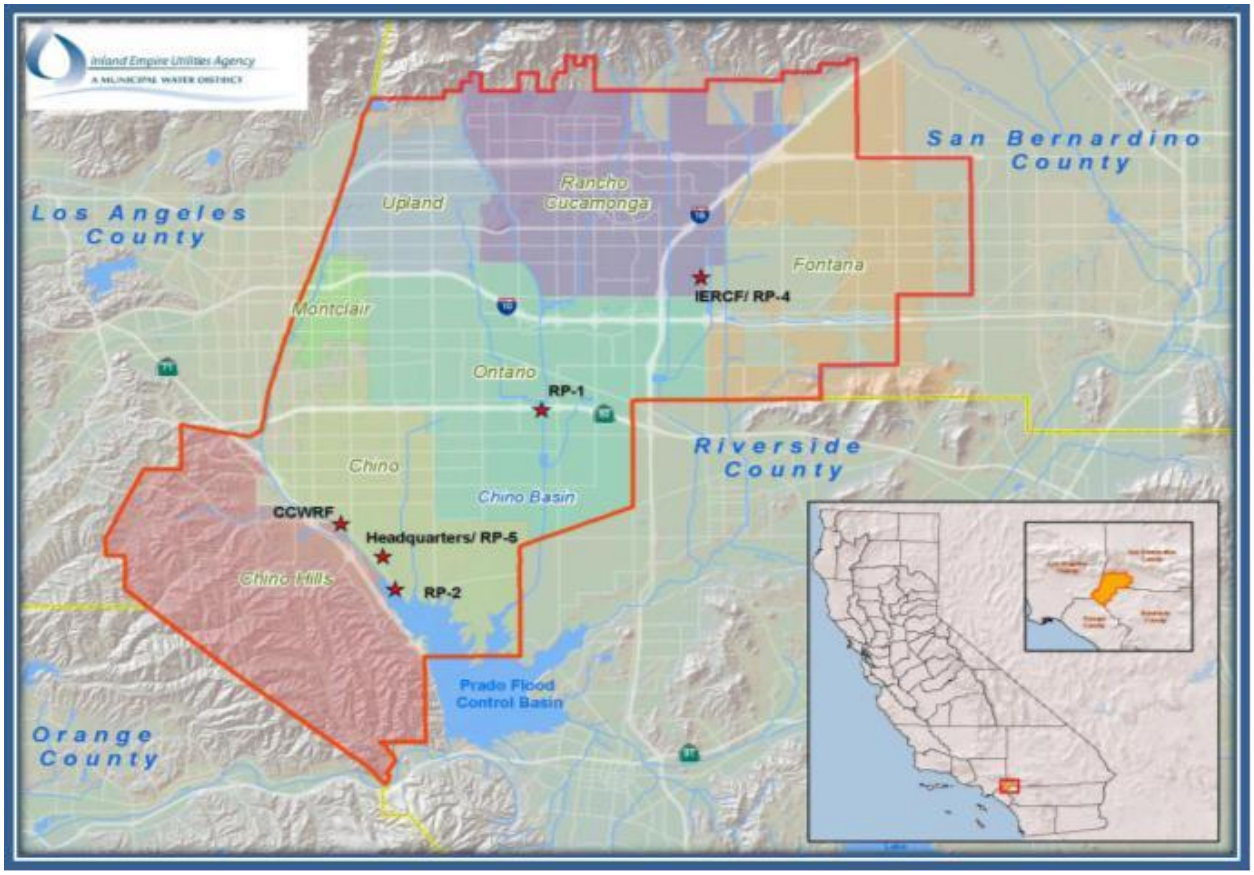

Figure 2-1: Agency Service Area

3. Agency Business Goals

3.1. Background of Agency Policy

Agency policy goals have guided the Agency's decisions and actions in executing their mission, while maintaining their values. Over the last several years, the Agency has categorized these Agency-wide policy goals into nine themes: (1) conservation and water quality, (2) technological innovation, (3) rate stabilization and cost effectiveness, (4) operational and maintenance efficiency, (5) strategic planning and capital implementation, (6) waste management and resource use, (7) interagency relationships and community partnerships, (8) fiscal accountability and regulatory compliance, and (9) staff training, development, and wellbeing. Each budget cycle, these Agency-wide policy goals guide them in developing the capital improvement program, operational budget, and organizational goals and objectives.

As a way to define the Agency's levels of service (LOS), the Agency held several workshops in 2011 with their Board of Directors. The levels of service developed during these workshops focused primarily on the Agency's operational functions. In early 2013, staff recommended that the levels of service be developed into more broad-based business goals. The Agency further decided that to better develop Agency Business Goals they should include input from their stakeholders, which include their Board of Directors, staff, Technical Committee members, and Policy Committee members.

3.2. Purpose of Agency Business Goals

Agency policy goals have guided the Agency's decisions and actions in executing their mission, while maintaining their values. To define the mission, vision, and values, the Agency looked to the needs of their stakeholders and the value of service provided to the public. To develop Agency-wide business goals, the Agency reviewed their existing policy goals and refined these goals according to their current and future needs. The Agency Business Goals sets the framework for developing additional planning documents that will shape and guide the Agency's fundamental decisions and actions over the next several years.

The adopted Agency Business Goals are fundamental to the development of several planning documents, including the Agency Strategic Plan, the Integrated Water Resources Plan, the individual Facility Master Plan Updates, and the Asset Management Plan. For any organization to remain relevant and effective, it must be able to prepare for change and to adapt. As illustrated in Figure 3-1, the Agency Business Goals must be continually evaluated as part of the planning process to ensure that the Agency meets the current and future needs of the region.

Figure 3-1: Relevance of Agency Business Goals to the Planning Process

3.3. Structure of Agency Business Goals

The Agency Business Goals were categorized into six main areas: (1) fiscal responsibility, (2) workplace environment, (3) business practices, (4) water reliability, (5) wastewater management, and (6) environmental stewardship. Within each business goal, the Agency established several objectives to support that business goal. For example, within water reliability, the Agency established the beneficial use of recycled water. For each objective, the Agency developed a commitment to define the level of service that they will provide. For example, the Agency is committed to developing the recycled water infrastructure, so they meet the objective of reusing 50,000 AFY by 2025. The structure of the Agency Business Goals is shown in Figure 3-2.

Figure 3-2: Structure of Agency Business Goals

3.4. Adopted Agency Business Goals

The remainder of this chapter presents the adopted Agency Business Goals, with each business goal presented on a single page.

A. Business Goal: Fiscal Responsibility

The Agency will safeguard their fiscal health through organizational efficiency, adoption of balanced multiyear budgets, and rates that (1) meet full cost-of-service targets, (2) maintain a high-quality credit rating, and (3) preserve established fund balance reserves to effectively address short-term and long-term economic variability. Furthermore, the Agency will provide open and transparent communication to educate member agencies on the Agency's fiscal policies.

1. **Funding & Appropriation (Agency Management; Financial Planning; Accounting; Fiscal Management)**

   Objective: To appropriately fund operational, maintenance, and capital investment costs.
   Recommended Commitment: The Agency will adopt service rates and fees that fully support the costs of service and provide a reliable and steady flow of operating revenue to support all operational expenses, capital replacement, and debt service costs. In addition, the Agency will ensure that service rates and fees support their goal to sustain high-quality commitment levels.

2. **Budget Planning (Agency Management; Financial Planning; Accounting; Fiscal Management)**

   Objective: To forecast as accurately as possible costs for operation, repair and replacement, capital improvement, and debt service in an effort to provide financial stability for the Agency and member agencies.
   Recommended Commitment: The Agency will provide multiyear forecast for costs of operation, repair and replacement, capital investment, and debt service to support the Agency's Board and member agencies' adoption of multiyear budgets and rates, enhancing the Agency's dependability and stability.

3. **Reserves (Financial Planning; Accounting; Fiscal Management)**

   Objective: To preserve fund reserves that sustain the Agency's long-term fiscal health and high-quality credit rating and that ensure their ability to effectively address economic variability.
   Recommended Commitment: The Agency will adopt financial policies to establish and preserve fund reserves above legally or contractually mandated levels so that they can maintain commitment levels. In addition, the Agency will support short- and long-term funding requirements. The Agency will also sustain their long-term fiscal health and high-quality credit rating to reduce future borrowing costs.

4. **Creditworthiness (Financial Planning; Accounting; Fiscal Management)**

   Objective: To sustain a high-quality credit rating and debt-service-coverage ratio to safeguard the Agency's fiscal health and reduce future borrowing costs.
   Recommended Commitment: The Agency will reinstate their credit rating to AAA by FY 2017/18 to reduce borrowing costs anticipated for expanding and improving existing facilities required to meet future growth in their service area.

B. Business Goal: Workplace Environment

The Agency is committed to providing a positive workplace environment by recruiting, retaining, and developing a highly skilled team dedicated to their mission, vision, and values.

1. Mission, Vision, and Values (All Agency Staff and Board)

Objective: To uphold Agency Business Goals, objectives, and commitment levels that support and advance the Agency's mission, vision, and values.
Recommended Commitment: The Agency will require the highest standard of ethical conduct from all Agency staff, promoting prudent leadership, integrity, collaboration, open communication, respect, accountability, high quality, passion, and efficiency.

2. Employer of Choice (Human Resources; Agency Management)

Objective: To be an employer of choice.
Recommended Commitment: The Agency will provide a work environment that will attract and retain highly skilled, motivated, professional, and committed employees.

3. Training (Agency Management; Human Resources)

Objective: To provide employees with state-of-the-art skills and knowledge to meet current and anticipated Agency needs.
Recommended Commitment: The Agency will facilitate and provide opportunities for staff to further their personal and professional development in support of maintaining a highly skilled workforce.

4. Staff Safety (Safety; Human Resources; Agency Management)

Objective: To promote and ensure a safe, healthy work environment to protect employees and stakeholders.
Recommended Commitment: The Agency will have no more than one day of lost time because of work-related illness or injury per 1,000 days worked.

C. Business Goal: Business Practices

The Agency is committed to applying ethical, fiscally responsible, and environmentally sustainable principles to all aspects of business and organizational conduct.

1. Efficiency and Effectiveness (All Departments)

Objective: To promote standards of efficiency and effectiveness in all Agency business practices and processes.
Recommended Commitment: The Agency will integrate lean techniques to evaluate their current business practices and processes and will identify ways to improve the quality, cost, and value of their services to the member agencies and the public.

2. Customer Service (All Departments)

Objective: To provide excellent customer service that is cost-effective, efficient, innovative, and reliable.
Recommended Commitment: The Agency will respond to member agencies and meet the Member Agencies' expectation for enhanced value-added services. The Agency will solicit stakeholder feedback on performance and goal alignment each year.

3. Regional Leadership and Community Relations (Agency Management; Planning; Engineering)

Objective: To cultivate a positive and transparent relationship with stakeholders to enhance quality of life, preserve heritage, and protect the environment.
Recommended Commitment: The Agency will partner with stakeholders on common issues to create and implement integrated and innovative solutions, minimize duplication of efforts, and support education and outreach to the public. Furthermore, the Agency will incorporate member agencies and regional water agencies into their various related projects and programs to achieve a transparent and broader regional representation.

4. Policy Leadership (Agency Management; Planning; Engineering)

Objective: To effectively guide, advocate, and campaign for the development of policies and legislation that benefit the region that the Agency serve.
Recommended Commitment: The Agency will promote a collaborative approach to develop positions on policies, legislation, and regulations that affect Agency policy objectives.

D. Business Goal: Water Reliability

The Agency is committed to developing and implementing an integrated water resource management plan that promotes cost-effective, reliable, efficient, and sustainable water use along with economic growth within the Agency's service area.

1. **Water Use Efficiency and Education (Planning; Engineering; Public Information)**

   Objective: To promote water-use efficiency through public education to enhance water supplies within the region and exceed state goals for reduction in per capita water use within the Agency's service area.
   Recommended Commitment: The Agency will reduce water use in their service area to less than 200 gallons per capita per day by 2018.

2. **New Water Supplies (Planning; Engineering)**

   Objective: To support member agencies and regional water agencies, the Agency will develop reliable, drought-proof, and diverse local water resources and supplemental water supplies to reduce dependence on imported water supplies.
   Recommended Commitment: The Agency will promote efforts to reduce demand for imported water during dry and normal years and to store imported water into the Chino Groundwater Basin during wet years. In addition, The Agency will support maximizing the beneficial use of existing water infrastructure, while meeting future increased demands through investment in local water resources, supplemental water supplies, and conservation efforts.

3. **Recycled Water (Planning; Engineering; Operations & Maintenance)**

   Objective: To support maximizing the beneficial reuse of recycled water to enhance reliability and to reduce dependence on imported water.
   Recommended Commitment: The Agency will finish developing a recycled-water infrastructure and will support the member agencies in achieving reuse of 50,000 AFY by 2025.

4. **Groundwater Recharge (Planning; Engineering; Operations & Maintenance)**

   Objective: To maximize all sources of groundwater recharge.
   Recommended Commitment: The Agency will support the recharge of all available stormwater and maximize the recharge of recycled water within the Chino Groundwater Basin. Furthermore, the Agency will pursue the purchase and storage of cost-effective supplemental water supplies.

E. Business Goal: Wastewater Management

The Agency will develop master plans for Agency systems and manage and construct these systems to ensure that when expansion planning is triggered, designs and construction can be completed to meet regulatory and growth needs in an expeditious, environmentally responsible, and cost- effective manner.

1. Capacity (Planning; Engineering; Construction Management)

***Objective*:** To maintain capacity within systems and facilities to meet essential service demands and to protect public health and environment.
***Recommended Commitment*:** The Agency will ensure that systems are managed and constructed so that 90 percent of capacity is never exceeded.

2. On-Time Construction (Engineering; Construction Management)

***Objective*:** To ensure capital projects are designed and implemented in a timely and economically responsible manner.
***Recommended Commitment*:** The Agency will design and construct facilities through efficient project management to ensure that 80 percent of projects are completed on schedule and 90 percent of projects are on budget.

3. Biosolids Management (Operations & Maintenance)

***Objective*:** To manage all Agency-produced biosolids in a US EPA compliant, fiscally prudent, and environmentally sustainable manner.
***Recommended Commitment*:** The Agency will ensure that 95 percent of the capacity of the Inland Regional Compost Facility is used, that all biosolids produced by the Agency are treated at this facility, that Agency solids generation is minimized through efficient dewatering operations, and that all compost is marketed for beneficial use.

4. Energy Management (Planning; Engineering; Operations & Maintenance)

***Objective*:** To optimize facility energy use and effectively manage renewable resources to achieve peak power independence, contain future energy costs, achieve statewide renewable energy, distribute generation and greenhouse-gas reduction goals, and provide for future rate stabilization.
***Recommended Commitment*:** The Agency will achieve peak power independence by 2020 by implementing renewable projects, energy management agreements, and operational efficiencies.

F. Business Goal: Environmental Stewardship

The Agency is committed to the responsible use and protection of the environment through conservation and sustainable practices.

1. Regulatory Compliance (Compliance; Operations & Maintenance)

Objective**:** To comply with all federal, state, and local laws at each Agency facility.
Recommended Commitment**:** The Agency will have no more than two notices of violation annually from the State Water Resources Control Board, Air Quality Management District, or Non-Reclaimable Waste System for all Agency-owned and operated facilities.

2. Good Neighbor Policy (Compliance; Operations & Maintenance)

Objective**:** To control odors at all Agency facilities for the purpose of improving the environment and being a good neighbor to the local community.
Recommended Commitment**:** The Agency will perform a quarterly odor-monitoring assessment to develop actual and acceptable baseline odor thresholds. Acceptable baseline thresholds will be used to measure treatment plant performance and drive necessary capital improvements.

3. Response and Complaint Mitigation (Compliance; Operations & Maintenance)

Objective**:** To investigate any environmental issue or complaint received at any Agency facility and to respond appropriately and promptly.
Recommended Commitment**:** The Agency will immediately respond to any event that threatens public health and safety and will respond within five working days to any non-emergency complaint or suggestion.

4. Environmental Responsibility (Agency Management; Planning; Engineering)

Objective**:** To strive to implement actions that enhances or promotes environmental sustainability and preservation of the region's heritage.
Recommended Commitment**:** The Agency will consider and assess environmental sustainability, public use, and heritage preservation options for all programs and projects.

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4. Future Demand and Growth

4.1. Wastewater Flow Projection

The Agency conducts wastewater flow forecasts annually, deriving the forecast from three components: (1) historical wastewater flow trends; (2) per capita or per dwelling-unit wastewater-generation factors; and (3) expected future growth numbers provided by contracting agencies. Using these projections, the Agency determines future demands on their facilities and anticipates needed modifications to Regional Water Recycling Plants (RWRP).

Based on analyses of the three components, the Agency has made ten-year flow projections for each of their RWRPs and for the service area as a whole. The Agency then compares the projected flows to current and future-planned plant capacities, presenting alternative scenarios that reflect possible diversions, bypasses, and recycle streams. For these forecasts, the "tributary area flow" is defined as raw wastewater flow from the service area that is a natural tributary to a particular RWRP without pumps, diversion, or bypasses. In contrast, the "treated influent flow" is the actual flow that is received and treated at the RWRP. The treated influent flow is different from the tributary area flow because the RWRPs are interconnected, allowing some of the tributary flow to be re-routed between plants. In addition, treated influent flow includes the recycle streams generated during solids processing that are sent back to the plant's headworks for additional treatment.

4.2. Wastewater Flow Trends

Figure 4-1 illustrates the wastewater flow pattern within the Agency in FY 2013/14 and the current flows being treated at each of the Agency's RWRPs. For FY 2013/14, the average raw wastewater flow treated was 52.2 MGD. Since FY 2006/07, the Agency's wastewater flows have declined by about 10 percent (similar to other local agencies). However, even though wastewater flows declined, the Agency has been able to increase the amount of recycled water supplied to users. The Agency has done so by using the San Bernardino Avenue lift station and the Montclair lift station to route additional raw wastewater to the recycling plants in the Northern Service Area, where the system has been expanded and where groundwater recharge basins are located.

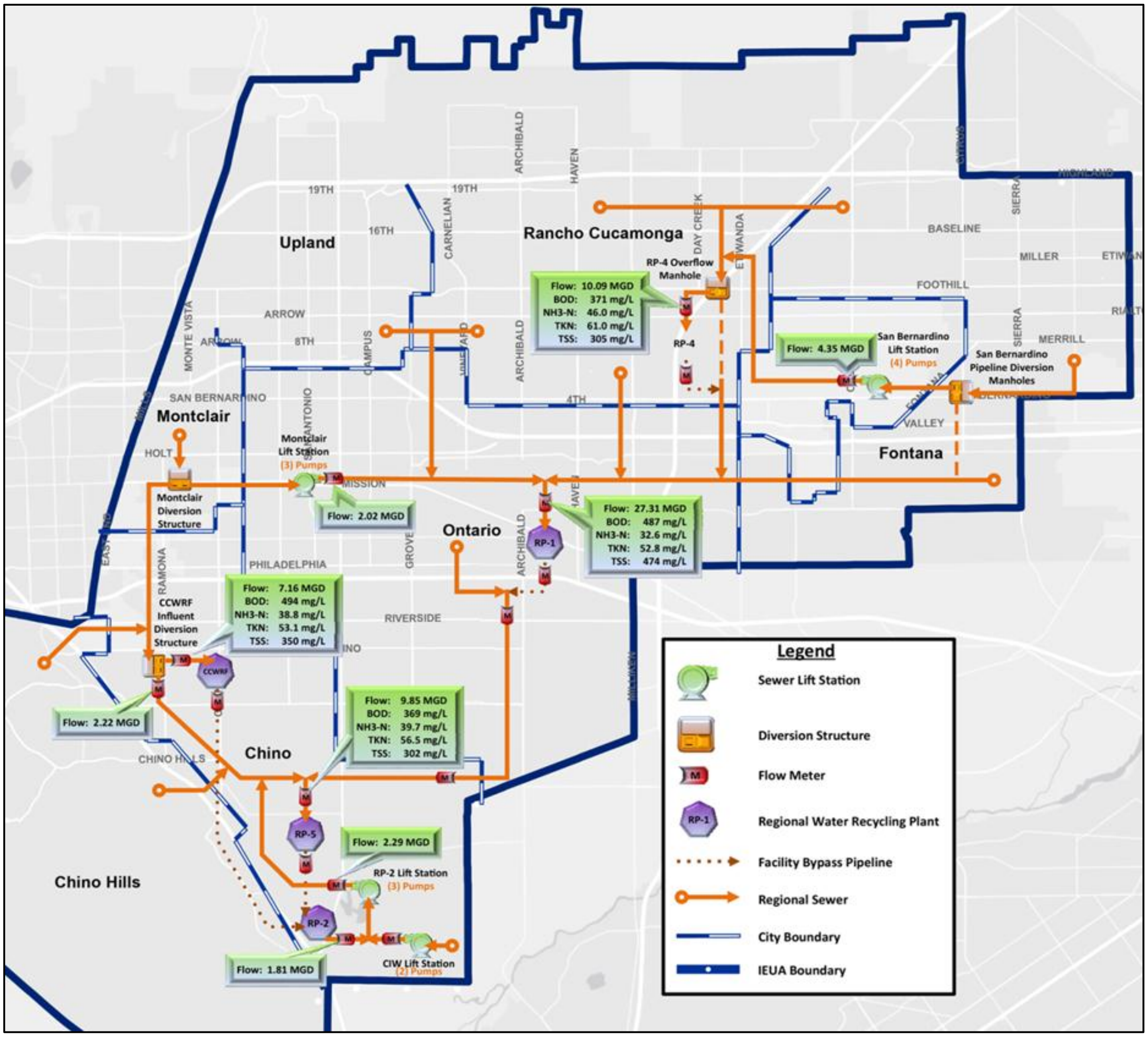
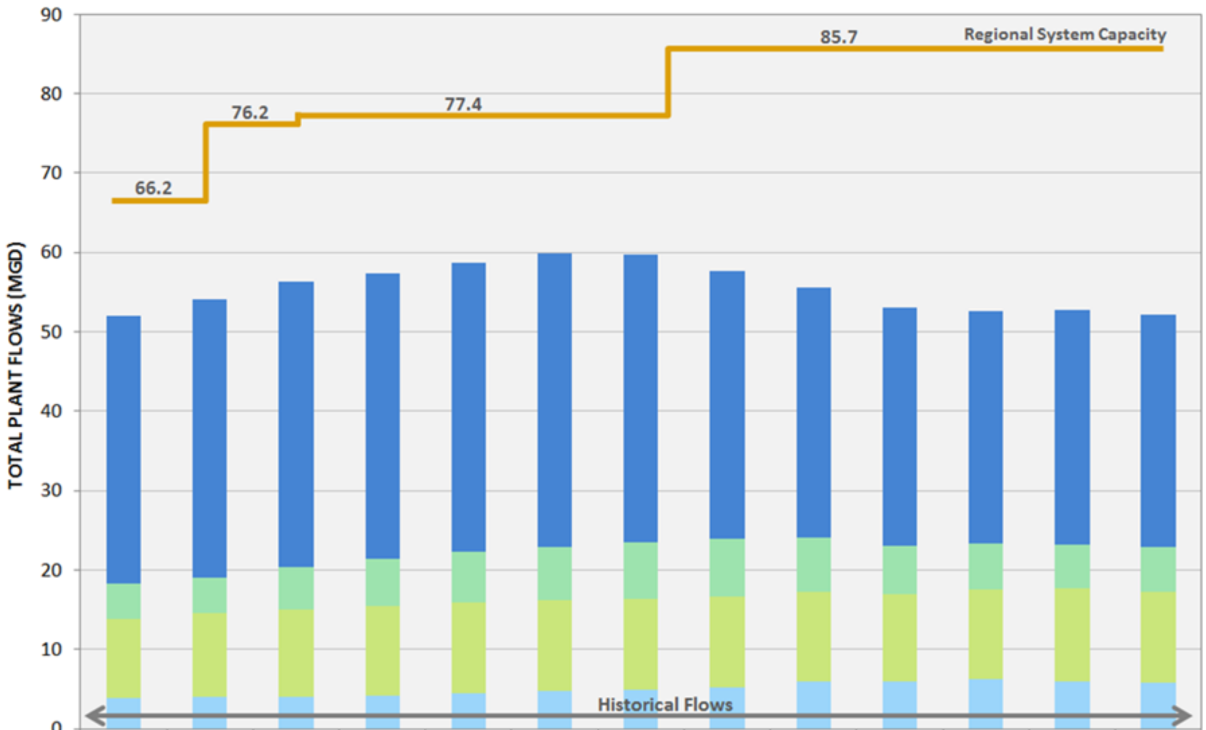


Figure 4-1: Wastewater Flow Pattern and RWRP Flows

The Agency's historical wastewater-flow trend is shown below in Figure 4-2. This figure depicts the raw wastewater from each RWRP's tributary area and the total wastewater for all facilities combined.



	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14
RP-1	33.80	34.97	36.00	35.95	36.46	37.00	36.21	33.70	31.40	30.00	29.30	29.54	29.30
RP-4	4.40	4.60	5.30	6.00	6.30	6.60	7.20	7.30	6.80	6.10	5.70	5.60	5.74
CCWRF	10.02	10.50	10.92	11.29	11.41	11.50	11.41	11.43	11.40	11.10	11.40	11.61	11.40
RP-5	3.80	3.99	4.07	4.18	4.51	4.71	4.91	5.17	5.90	5.90	6.20	6.00	5.76

Figure 4-2: Regional Plant Wastewater Flow History

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5. State of the Assets Summary

5.1. Asset Valuation

The current replacement and depreciated values for Agency assets are summarized in Table 5-1.

Table 5-1: Agency Replacement and Depreciated Values

Asset Group	Acquisition Value	Book Value (Depreciated Value)	Book Value / Replacement Value
Land	$ 14,000,000	$ 14,000,000	100%
Land Improvements	$ 19,000,000	$ 11,100,000	58%
Collection, Outfall & Transfer Lines	$ 120,800,000	$ 59,800,000	50%
Interceptors, Tie-Ins	$ 29,100,000	$ 21,000,000	72%
Recycled Water System	$ 96,600,000	$ 85,300,000	88%
Wells	$ 5,400,000	$ 4,800,000	89%
Reservoirs, Basins, Ponds	$ 104,600,000	$ 83,400,000	80%
Treatment Plants, Pump Stations	$ 216,700,000	$ 122,900,000	57%
Plant Office Buildings	$ 30,000,000	$ 20,300,000	68%
Office Facilities	$ 12,100,000	$ 9,800,000	81%
Equipment	$ 130,100,000	$ 65,600,000	50%
Office Furniture and Fixtures	$ 2,800,000	$ 300,000	11%
Auto and Trucks	$ 3,300,000	$ 200,000	6%
Computer Software	$ 7,900,000	$ 3,800,000	48%
CSLAC-Facility & Capacity Rights	$ 38,200,000	$ 23,800,000	62%
SAWPA-Capacity Rights	$ 12,500,000	$ 6,700,000	54%
MWD Connections	$ 200,000	$ -	0%
Organizational Costs	$ 1,800,000	$ 1,300,000	72%
Total	**$ 845,100,000**	**$ 534,100,000**	**63%**

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6. Long-Term Asset Management

6.1. Long-Range Plan of Finance (LRPF) Model

The Long-Range Plan of Finance (LRPF) aligns the Agency's financial capacity with long-term service objectives. The LRPF uses forecasts to provide insight into the Agency's future financial capacity so that Agency strategies can achieve long-term sustainability of financial and service objectives. Actions taken in the short-term can have implications over multiple years. By projecting financial trends over a long period, the Agency can better anticipate and prepare for necessary adjustments and reduce any sudden impact to its stakeholders and operations. This projection allows for the most cost-effective funding strategy for supporting operations and capital requirements that are in line with established policies and goals of the Agency. As outlined in the FY 2011/12 LRPF, the Agency's financial policies are to

- Maintain programs that are self-supported through user fees and charges;
- Levy moderate rate increases to support program requirements;
- Employ cost containment measures that will ensure achievement of debt-coverage ratio targets recommended by the Board of Directors;
- Maintain adequate fund balances consistent with bond covenant requirements; and
- Minimize the Agency's borrowing costs.

Development of the LRPF is ongoing, with a complete robust and dynamic LRPF model anticipated in summer 2015. Some of the proposed features of the new financial model include extending the scope from 10 to 50 years, execution of multiple "what if" scenarios to highlight the effect of certain variables, and on-screen graphic presentations to more effectively communicate the alternatives and outcomes.

This chapter will be developed further in subsequent Asset Management Plans to present results of modeling work.

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7. Asset Management System Summaries

7.1. Introduction

To assemble a comprehensive description of assets, the Agency developed summaries of each asset management system. These summaries provide the Agency with a useful tool to determine those assets that are most critical to focus on. The Agency assets are organized according to the following twelve systems.

1. Regional Water Recycling Plant No. 1 (RP-1)
2. Regional Water Recycling Plant No. 2 (RP-2)
3. Carbon Canyon Water Recycling Facility (CCWRF)
4. Regional Water Recycling Plant No. 4 (RP-4)
5. Regional Water Recycling Plant No. 5 (RP-5)
6. Recycled Water Distribution (RW) & Ground Water Recharge (GWR) Systems
7. Inland Empire Regional Composting Facility (IERCF)
8. Agency Lift Stations (LS)
9. Regional Conveyance System (RC)
10. Agency Laboratory (Lab)
11. Agency Headquarters (HQ)
12. Business (BIZ) & Process Automation Control (PAC) Networks

When appropriate, systems have been divided into subsystems to aid in the logical presentation of information. For example, the regional water recycling plants have been divided into the following treatment process subsystems.

- Preliminary Treatment
- Primary Treatment
- Secondary Treatment
- Tertiary Treatment
- Solids Treatment
- Dewatering Treatment
- Auxiliary Systems

The Recycled Water & Ground Water Recharge Systems have been divided into the following pressure zone subsystems.

- 800-foot pressure zone
- 930-foot pressure zone
- 1050-foot pressure zone
- 1158-foot pressure zone
- 1299-foot pressure zone
- 1630-foot pressure zone (east and west)

Each summary has been developed by engineers with extensive operations experience to ensure that the systems have been thoroughly evaluated and the critical assets identified.

7.2. Structure of Asset Management System Summaries

The Asset Management System Summaries have been developed with a common base structure, providing a foundation for their continued use and development. The summaries are updated to reflect the current condition of each system. Each system summary follows the structure described below, beginning with a schematic, followed by a project summary table, and culminating in a summary sheet or sheets.

- **System Schematic** – Displays a schematic representation of the system.
- **Project Summary Table for System** – Lists the existing projects relating to the system along with yearly budget allocations over a ten-year period. Please note that Agency departments will individually budget for routine replacement and rehab of system assets, and most of these budgets items will not be summarized in the project summary tables.
- **Subsystem Summaries** – Describes the subsystem of a given system on a single 11 x 17-inch sheet divided into the following six sections:
    - Asset Profile – Describes the assets and their primary functions.
    - Capacity Profile – Describes the key capacity-design values for assets in terms of average flow requirements.
    - Asset Ratings – Presents a summary score on a 1 (best) to 5 (worst) scale, based on the current performance of the asset. The standards for the scoring scale are defined in Appendix A.
    - Key Issues – Lists treatment process and equipment issues (deficiencies) based on performance data and Operations and Maintenance Department Staff knowledge and will indicate which existing project will address the issue. If an issue is not being addressed by an existing project, then the need for a potential project will be noted within the key issue description.
    - History of Select Assets – Provides dates of past capital improvement project activity and of planned or completed condition-assessment reports.
    - Potential Projects – Lists potential projects to consider for addressing deficiencies not being addressed by existing projects.

7.3. Future Development of Asset Management System Summaries

The Agency will continue to maintain, update, and expand Asset Management System Summaries for future Asset Management Plans. The Asset Management System Summary for the Regional Conveyance System could only be partially developed for this Asset Management Plan and will be developed further in the future.

7.4. Asset Management System Summaries

This section starts with Table 7-1 that summarizes Agency-wide projects relating to multiple systems—that is, those not included in project tables for individual systems—followed by the Asset Management System Summaries.

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Table 7-1: Agency-wide Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN12020	Chino Creek Invert Repair	Repair of Chino Creek invert near CCWRF where differential settling occurred. Remove and replace remaining discharge line to the creek.	RC	RP	375,000	0	0	0	0	0	0	0	0	0	375,000
2	EN13056	Agency-Wide HVAC Improvements - Pckg No. 2	Evaluate electrical and control buildings HVAC systems and provide solutions/upgrades for the RP-4 Motor Control Center #5, CCWRF Switchgear Room, RP-4 Main Building and RP-1 Maintenance Building. Replace the evaporative coolers for the CCWRF switchgear with air conditioning system and modify the ventilation system configuration.	RC	CC	50,000	0	0	0	0	0	0	0	0	0	50,000
3	EN15032	Agency-Wide HVAC Improvements- Pckg No. 3	Evaluate electrical and control buildings HVAC systems and provide solutions/upgrades for the RP-1 Chemical Storage Warehouse, RP-5 Control Room, and RP-5 Power Center No. 3. RP-5 Control Room HVAC ducting system will be modified to serve the Control Room via the adjacent SCADA Room air conditioning (AC) system to enhance performance and save energy. Power Center No.3 AC system will be augmented to provide additional cooling for the electrical equipment for reliable operation and extend equipment life.	RC	CC	1,000,000	100,000	0	0	0	0	0	0	0	0	1,100,000
4	EN17003	Aeration System Improvements	Agencywide aeration system improvements. TS currently evaluating membranes: to be completed in 2015. Once complete, will implement across all facilities.	RC	CC	0	0	0	0	0	0	0	250,000	3,000,000	3,000,000	6,250,000
5	EN17004	Agencywide Energy Efficiency Study	Agencywide upgrades to the lighting systems and process equipment systems to improve efficiency. Start design in FY18/19.	RO	OM	200,000	0	0	0	0	0	0	0	0	0	200,000
6	TBD	Agencywide Energy Efficiency Improvements	Agencywide upgrades to the lighting systems and process equipment systems to improve efficiency. Start design in FY18/19.	RO	CC	300,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	4,800,000
7	EP15002	Major Equipment Rehab/Replace	Agencywide annual R&R of major equipment (pumps, heat exchangers, compressors, etc)	RO	EQ	500,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	4,100,000

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
8	PA15001	Underground Piping Rehab Assessments	Annual underground piping rehab Agency wide within facilities.	RO	OM	200,000	200,000	200,000	200,000	200,000	50,000	50,000	50,000	50,000	50,000	1,250,000
9	PA15002	Agency Wide Coatings and Paving	Agencywide annual maintenance for coatings and paving	GG	OM	200,000	200,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,200,000
10	PA15008	Major Asset Rehab/Replace	Agencywide annual R&R of major assets (buildings, vehicles, etc)	GG	OM	150,000	50,000	50,000	50,000	150,000	50,000	50,000	50,000	150,000	50,000	800,000
11	SR12001	Agencywide Security Equipment Upgrade	Agencywide Security Equipment Upgrade	RC	CC	0	0	50,000	0	0	0	0	0	0	0	50,000
12	TBD	CEQA document for implementation of WWFMP, IRP, RWPS, etc.		RC	OM	500,000	250,000	0	0	0	0	0	0	0	0	750,000
13	TBD	As Built Database Upgrades (TMP)	Provide a tool to facilitate the search capability of as-builts.	GG	OM	50,000	150,000	0	0	0	0	0	0	0	0	200,000
14	TBD	NRWS OE Projects	The project establishes an annual budget for applying the labor hours for project evaluation, design review, permit issuance, inspection, and closeout for office engineering projects related to NRW connections and modifications.	NC	OM	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000
15	TBD	RC OE Projects	The project establishes an annual budget for applying the labor hours for project evaluation, design review, permit issuance, inspection, and closeout for office engineering projects related to sewer connections and modifications.	RC	OM	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	500,000
16	TBD	NRWS Emergency O&M Projects	This project will allow Engineering and Construction Management to fund unforeseen NRW O&M projects that require immediate attention. The project will provide the Agency funds to allow Engineering and Construction Management to facilitate such items as pipeline repairs, property negotiations, and other unforeseen, unbudgeted issues without requesting additional funds (unless absolutely necessary) during a given fiscal year. This project is being budgeted with yearly allocations to be able to handle these issues each fiscal year.	NC	OM	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	2,000,000
17	TBD	WC Emergency O&M Projects	This project will allow Engineering and Construction Management to fund unforeseen RW O&M projects	WC	OM	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	5,000,000

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
			that require immediate attention. The project will provide the Agency funds to allow Engineering and Construction Management to facilitate such items as pipeline repairs, property negotiations, and other unforeseen, unbudgeted issues without requesting additional funds (unless absolutely necessary) during a given fiscal year. This project is being budgeted with yearly allocations to be able to handle these issues each fiscal year.													
18	TBD	RC Emergency O&M Projects	This project will allow Engineering and Construction Management to fund unforeseen RC O&M projects that require immediate attention. The project will provide the Agency funds to allow Engineering and Construction Management to facilitate such items as pipeline repairs, property negotiations, and other unforeseen, unbudgeted issues without requesting additional funds (unless absolutely necessary) during a given fiscal year. This project is being budgeted with yearly allocations to be able to handle these issues each fiscal year.	RC	OM	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	6,000,000
19	TBD	RO Emergency O&M Projects	This project will allow Engineering and Construction Management to fund unforeseen RO O&M projects that require immediate attention. The project will provide the Agency funds to allow Engineering and Construction Management to facilitate such items as pipeline repairs, property negotiations, and other unforeseen, unbudgeted issues without requesting additional funds (unless absolutely necessary) during a given fiscal year. This project is being budgeted with yearly allocations to be able to handle these issues each fiscal year.	RO	OM	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	6,000,000
20	TBD	Agencywide Digester Cleaning and Rehab	The Agency has established an Agency-wide digester annual cleaning and rehabilitation regimen to remove solids and inorganics collected at the bottom of the digesters, replace valves, install new seals, and maintain critical pieces of equipment.	RO	OM	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	5,000,000

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
21	TBD	Agency Bypass Pumping Project	Procure pumps for bypass pumping of 20mgd and provide electrical connectivity to MCCs.	RO	EQ	1,000,000	1,000,000	0	0	0	0	0	0	0	0	2,000,000
22	TBD	Regional Wastewater Projects AMP	Facility Asset Management projects as determined in the future.	RO	RP	0	0	0	0	0	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	50,000,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014
(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)
(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

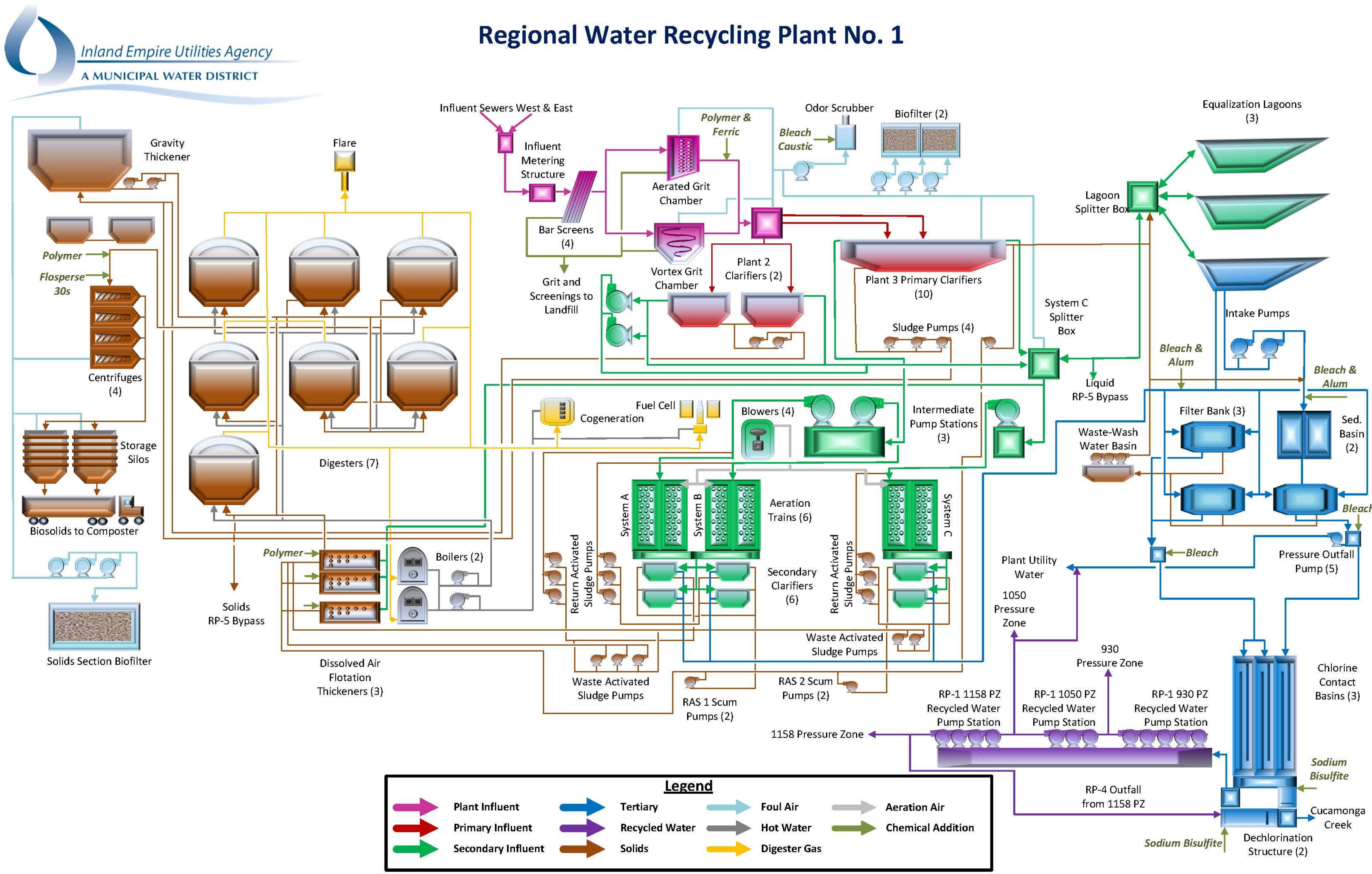

Figure 7-1: Regional Water Recycling Plant No. 1 (RP-1) – Schematic

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Table 7-2: Regional Water Recycling Plant No.1 – Project Summary

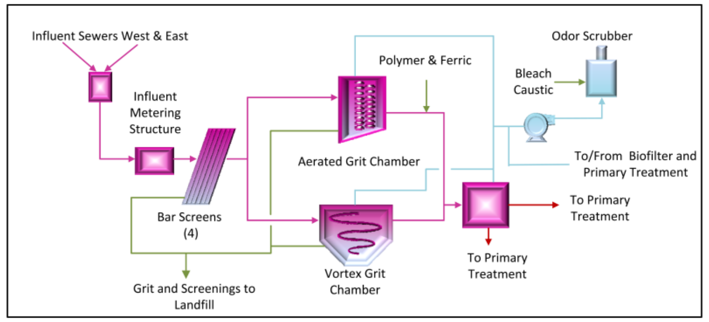
#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN08023	RP-1 Asset Replacement	Redesign needed for the RP-1 Primary Clarifier flights.	RO	CC	600,000	0	0	0	0	0	0	0	0	0	600,000
2	EN11039	TP-1 Disinfection Pump Improvements	Engineering project to upgrade dosing facilities at OES and NES to allow full post filtration chlorination.	RC	RP	95,000	225,000	0	0	0	0	0	0	0	0	320,000
3	EN13046	RP-1 Flare System Improvements	Project to upgrade to pressure regulating valve, replace digester valve, pressure loss evaluation, and pavement addition.	RC	RP	400,000	0	0	0	0	0	0	0	0	0	400,000
4	TBD	RP-1 Flare Improvements	RP-1 flare improvement and gas system upgrades.	RC	RP	0	0	2,000,000	2,000,000	0	0	0	0	0	0	4,000,000
5	EN14019	RP-1 Headworks Gate Replacement	Engineering project to comprehensively rehab and upgrade the Preliminary Treatment Process. Gate Replacement. Start design in FY15/16.	RC	RP	700,000	2,700,000	0	0	0	0	0	0	0	0	3,400,000
6	EN15012	RP-1 East Primary Effluent Pipe Rehab	Rehab of the east primary effluent piping between the rectangular primary clarifiers and the Intermediate Pump Station wet well. Also includes the IPS structure updates	RO	RP	600,000	1,400,000	0	0	0	0	0	0	0	0	2,000,000
7	EN15013	RP-1 TWAS and Primary Effluent Piping Replacement 2014	Failures in the TWAS and primary effluent piping require pipe to be replaced.	RO	RP	350,000	0	0	0	0	0	0	0	0	0	350,000
8	EN15019	RP-1 Odor Control Improvements Evaluation	Odor control improvements (clarifier covers, foul air equipment, etc)	RC	CC	300,000	0	0	0	0	0	0	0	0	0	300,000
9	EN15020	RP-1 Plant 3 Primary Scum Well Upgrade	Potential project to address scum pumping capacity issues, as well as, evaluate MCC in primary pumping gallery.	RC	CC	325,000	0	0	0	0	0	0	0	0	0	325,000
10	EN18004	RP-1 IPS System Improvements	Project to address deficiencies in system (e.g., replace eddy clutches with VFDs)	RC	CC	0	0	250,000	750,000	0	0	0	0	0	0	1,000,000
11	EN19007	RP-1 Primary Effluent EQ Elimination	Scope will be determined by findings of Master Plan update. Potential project to address odor related to equalizing primary effluent.	RC	CC	0	0	0	0	0	0	0	0	2,750,000	2,750,000	5,500,000
12	EN20006	RP-1 Digester Mixing Upgrade	Potential Engineering project to upgrade the digester mixing systems. Start design in FY19/20.	RC	CC	0	0	0	0					250,000	500,000	750,000
13	TBD	Chino Basin Groundwater Supply Wells and Raw Water Pipeline (Plume)	Project Scope Description needs to be defined.	RC	OM	9,000,000	3,000,000	0	0	0	0	0	0	0	0	12,000,000
14	TBD	RP-1 Liquid Treatment Expansion	Expand RP-1 liquid train treatment to 40mgd	RC	CC	0	0	0	0	0	0	0	0	5,700,000	5,700,000	11,400,000

15	TBD	RP-1 Solids Treatment Expansion	Expand RP-1 solids treatment capacity.	RC	CC	0	0	0	0	0	0	0	0	1,617,500	1,617,500	3,235,000
16	TBD	RP-1 Mixed Liquor Return Pump Improvements	Install Mixed Liquor Return pumps to the six aeration trains at RP-1.	RO	EQ	1,000,000	3,000,000	0	0	0	0	0	0	0	0	4,000,000
17	TBD	RP-1 Expansion PDR	As recommended by the WWFMP and also needs to include the Headworks assessment, GT, Odor Control, Septage Dump Station	RC	CC	1,000,000	500,000	0	0	0	0	0	0	0	0	1,500,000
18	TBD	RP-1 NGO Meters Interconnection Agreement Installation	SCE interconnection	RO	CC	800,000	100,000	0	0	0	0	0	0	0	0	900,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014
(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)
(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (O&M), Reimbursable Project (RE), or Capital Replacement Project (RP)

Asset Management System Summary – RP-1
Preliminary Treatment Process

1. Asset Profile



Influent Channel and Metering Station
Two main trunk lines (east and west) bring influent sewer flows into RP-1 through the influent structure with gates to divert flow to either of two Parshall flume flow meters. Flow from the influent metering station enters a common channel before the bar screening structure. A septage dump station for private haulers is located upstream of the screening equipment.

Screening Equipment
Gates divert flow to six channels, four mechanical bar screens, one manual bar screen, and one bypass channel. The 5/8-inch spaced bar screens capture large debris, protecting downstream processes. A mechanical climber rake collects debris and drops the screenings on the screening conveyance/disposal system. Liquid flow passes through the bar screen into a common channel that feeds the grit removal systems.

Aerated Grit System
Flow enters a series of three square aerated grit chambers (AGC) through five gates. Three air-lift pumps, supplied by two air blowers, pump collected grit up to the grit washing/disposal system. Air from the blowers also provides air for agitation. Liquid flows pass through gates to a common channel and then to the headworks splitter box.

Vortex Grit System
Flow from the bar screens are directed to the influent of the circular vortex grit chamber. A paddle mixer pushes flow in a circular path; grit collects at the bottom, where it is pumped to the grit washing/disposal system.

Grit Washing/Disposal System
Grit pumped from the AGC and vortex grit chamber enter the Headworks Building where it flows to two grit classifiers. The grit sinks to a submerged screw that pulls the grit out of the water and drops grit into two screw conveyors. The conveyors lift and transport the grit to a roll-off bin. The excess liquid spills out of the grit classifiers and is directed back to the bar screen structure effluent channel.

Screenings Conveyance/Disposal System
Screenings collected by the bar screens are transported by a conveyor and dropped into a hydraulic compactor. The compactor compresses the collected screenings, squeezes out excess water, and pushes the screenings to the roll-off bin.

Ferric Chloride System
Ferric chloride is added to the liquid flow after grit removal to enhance primary treatment and to control sulfide emissions. Ferric chloride can also be valved to the digesters. The ferric station consists of a truck filling station, storage tank, three chemical metering pumps, and associated piping.

Polymer System
Polymer is added the liquid flow after grit removal to enhance primary treatment. The polymer system includes a tote stand, chemical metering pump, mixing chamber, and associated piping.

Headworks Splitter Box
The headworks splitter box receives flow from both grit systems, the bar screens structure bypass, and the overflow from the solids section gravity thickener. Flow can be diverted to the Plant 3 rectangular clarifiers or to the Plant 2 circular clarifiers for primary treatment.

Odor Scrubber
Foul air collected in the preliminary and primary treatment processes is forced through the odor scrubber tower with plastic porous media, where a solution of bleach and caustic soda trickles against the air flow to oxidize hydrogen sulfide and other compounds. The odor scrubber is used to supplement the foul air treatment provided by the biofilter.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Preliminary Treatment Process	44 MGD	
Influent Channel and Metering Station		
East Sewer	42-inch	
West Sewer	42-inch	
Parshall Flumes	2 @ 55 MGD	Per Unit
Gates	2 units	
Septage Station	1 unit	
Screening Equipment		
Mechanical Screen	4 @ 27.5 MGD	Per Unit
Manual Screen	2 @ 27.5 MGD	
Gates	15 units	
Aerated Grit System		
Chambers	1 @ 44 MGD	
Pumps	3 @ 150 gpm	Per Unit
Blowers	2 @ 360 scfm	Per Unit
Gates	10 units	
Vortex Grit System		
Chamber	1 @ 20.4 MGD	
Pump	1 @ 300 gpm	
Gates	4 units	
Grit Washing/Disposal System		
Classifiers	2 @ 300 gpm	Per Unit
Conveyors	2 @ 3 wet tons per hr	Per Unit
Screening Conveyance/ Disposal System		
Conveyor	5.0 hp	
Compactor	5.0 hp	
Ferric Chloride System		
Tank	13,000 gallons	
Pumps	3 @ 37.4 gph	Per Unit
Polymer System		
Pump	1 @ 4.5 gph	
Headworks Splitter Box		
Gates	3 units	
Odor Scrubber		
Blowers	2 @ 8,000 scfm	Per Unit
Valves	2 units	> 18-inch

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Influent Channel and Metering Station	4	2	3	3
Screening Equipment	3	2	3	3
Aerated Grit System	3	3	4	3
Vortex Grit System	4	3	4	5
Grit Washing/Disposal System	3	3	3	4
Screening Conveyance/Disposal System	4	5	3	5
Ferric Chloride System	3	3	3	3
Polymer System	3	3	3	3
Headworks Splitter Box	3	5	3	3
Odor Scrubber	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues

Influent Channel and Metering Station
The east isolation gate leaks. In addition, there is currently no odor control directly tied into the influent channel. A condition assessment planned for 2015 may identify the need for odor control. Project EN14019 will replace the isolation gates.

The septage dump station is out of date and requires manual sampling of the septic flow prior to dumping. A potential project should evaluate a modern septage dump system at the most appropriate location within the Agency. The next major capital project within the preliminary treatment process may address this issue.

Screening Equipment
The bar spacing allows a significant amount of debris to reach downstream processes. A substantial number of the gates are broken and inoperable. In addition, the foul air containment leaks, as evident by internal smoke tests. Project EN14019 will replace the broken and inoperable gates.

Aerated Grit System
The AGC allows large amounts of grit to pass through to downstream processes. Many of the gates are broken and inoperable. Project EN14019 will replace the broken gates and upgrade or replace the AGC.

Vortex Grit System
The vortex grit chamber is not operated because the grit piping clogs frequently when the chamber is in operation. A potential maintenance project will rehab this system.

Grit Washing/Disposal
Recent failures of the classifier and the conveyors screws have indicated excessive wear from heavy use. The availability of spare parts results in parts from both systems being pieced together to have one working system. A potential maintenance project will rehab this system.

Screenings Conveyance/Disposal System
The conveyor equipment is corroded and has limited accessibility for cleaning and repair. The compactor welds and hoses fail regularly (3 to 4 times per year). Maintenance project EP14002 will replace the screenings conveyor and compactor in 2014.

Ferric Chloride System
The ferric chloride system operates effectively, but the equipment is approaching the end of its useful life. Project EN14019 will rehab this system.

Polymer System
This system will be rehabbed by Project EP14002 or EN14019.

Headworks Splitter Box
Many of the gates are broken and inoperable. Project EN14019 will replace these gates.

Odor Scrubber
The odor scrubber is a viable alternative if the primary section biofilter needs to be taken offline.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Influent Channel and Metering Station	1977 1987	Planned 14/15
Screening Equipment	1977 1987	Planned 14/15
Aerated Grit System	1987	Planned 14/15
Vortex Grit System	1987	
Grit Washing/Disposal System	1977 1987 2009	
Screening Conveyance/Disposal System	1977 1987	
Ferric Chloride System	1987 1992	
Polymer System		
Headworks Splitter Box	1977	Planned 14/15
Odor Scrubber	1996	

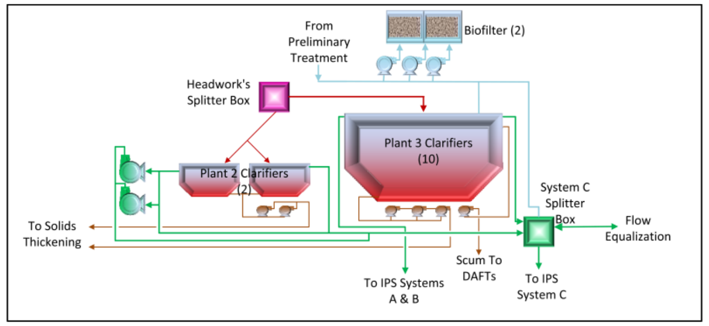
Table 4 Potential Projects

System	Project Name	Project Description
Preliminary Treatment	RP-1 Headworks Rehab	Project to comprehensively rehab and upgrade the Preliminary Treatment Process. Bar Screens and Grit/Sand Removal System.
Grit Washing Rehabilitation	RP-1 Grit Washing and Disposal Upgrades	Upgrade and repair the existing grit washer and conveyor
Influent Channel and Metering Station	Septage Dump System	Provide a modernized septage dump system at the most appropriate location within the Agency.

System Summary Continued on Next Page

Asset Management System Summary – RP-1
Primary Treatment Process

1. Asset Profile



<u>Plant 3</u>

Influent Channel
Two pipes from the headwork's splitter box divert flow to the Plant 3 influent channel. Each clarifier has three gates from the influent channel to allow flow to enter each clarifier. The channel is aerated with air from blowers to keep solids in suspension.

Primary Clarifiers
The rectangular clarifiers consist of chain-driven flights, which push settled solids and collected floatables to a sludge hopper for pumping or to scum troughs for solids processing. Each clarifier consists of three or four effluent troughs with V-notch weirs. The clarifiers are covered for odor control.

Effluent Channel
Each effluent trough discharges into a common channel. Two legs with valves direct flow from the effluent channel to the intermediate pump system A&B wet well or the system C splitter box. The effluent channel is covered and has odor control ducting to the biofilter.

Sludge Pumping System
A series of valves opens and closes to direct solids collected in each clarifier to three pumps, sending flow to solids thickening processes.

Scum System
Scum collected by the primary clarifiers is directed to a common wet well. Periodically a pump will pull from the wet well and pump to solids thickening processes.

<u>Plant 2</u>

Primary Clarifiers
Flow from the headworks splitter box is directed through a flow meter and a series of valves/gates to two circular clarifiers. The clarifiers are center feed with a rotating arm to push solids to a sludge hopper and floatables to the scum removal trough. Effluent from the clarifiers is piped to the Intermediate pump station wet wells. These clarifiers are put in service when flow needs to be diverted from Plant 3, but are not used during normal operation.

Solids Pumping System
Solids collected from the Plant 2 clarifiers are directed to two pumps. The pumps send flow to solids thickening processes in the solids section.

Trickling Filter Pumps
Effluent from the west Plant 2 clarifier can be pumped via the trickling filter pumps to the system C splitter box. The effluent collects in an old trickling filter wet well and is pumped through a series of splitter boxes until it reaches the system C splitter box.

Biofilter
Three blowers pull foul air from the Plant 3 primary clarifiers, system C splitter box, and the preliminary treatment section, forcing the air through two beds of carbon rich media to allow for the biological consumption of hydrogen sulfide and other compounds.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
<u>Plant 3</u>	33.6 MGD	
Influent Channel Blowers	3 @ 25 hp	Per Unit
Primary Clarifiers Flight Drives Gates	10 @ 2,400 gpd/ft^2 3,500 ft^2 5 @ 0.5 hp 34 units	Per Unit Per Unit
Effluent Channel Bladder Valves	2 units	
Sludge Pumping System Pumps	3 @ 412 gpm 30/20/20 hp	Per Unit
Scum Pumping System Pump	1 @ 130 gpm 7.5 hp	Per Unit
<u>Plant 2</u>	15.1 MGD	
Primary Clarifiers Gates Valve	2 @ 2,400 gpd/ft^2 7,854 ft^2 4 units 1 unit	Per unit
Sludge Pumping System Pumps	2 @ 175 gpm 15 hp	
Trickling Filter Pumps	2 @ 9,000 gpm 100 hp	
Biofilter Media Blowers Valves	9,293 ft^2 4.5 ft depth 2 @ 11,700 scfm 40 hp 1 @ 12,205 scfm 50 hp 15 units	 Per Unit > 18-inch

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
<u>Plant 3</u>				
Influent Channel	3	3	3	3
Primary Clarifiers	4	1	3	4
Effluent Channel	4	3	3	3
Sludge Pumping System	3	3	3	3
Scum Pumping System	3	4	3	3
<u>Plant 2</u>				
Primary Clarifiers	3	3	3	3
Sludge Pumping System	3	3	3	3
Trickling Filter Pumps	4	3	4	3
Biofilter	2	3	3	3

* Ratings as defined in Appendix A

4. Key Issues

<u>Plant 3</u>

Influent Channel
The influent channel operates effectively; however, floatable solids have a tendency to collect in the channel, requiring collections crew to make semi-regular cleanings of the channel.

Primary Clarifiers
Small pieces of the chain/flight system break requiring significant maintenance activities to repair. The chain and flight of all the Primary Clarifier are experiencing extensive failures. Remedies are currently being evaluated under project EN08023.

Effluent Channel
The effluent channel is currently in the process of being recoated through Project EN08023.05.It is suspected that the bladder valve leading from the effluent channel to the intermediate pump stations has failed and does not divert flow as originally designed. Recent evaluations of underground piping to the intermediate pump stations have indicated extensive corrosion. Project EN15012 will replace the east primary effluent piping, including structure upgrades.

Sludge Pumping System
No issues require special attention.

Scum System
The scum wet well has limited controls and instrumentation. The floatables form a raft in the wet well, and the scum pump suction pulls from the bottom of the scum box. The floatables are required to be vactored regularly. The scum collection system is currently being retrofitted to a tipping trough under project EN08023; however, EN15020 will address scum accumulation in the wet well is not being addressed; a future project is required.

<u>Plant 2</u>

Primary Clarifiers
The clarifiers are not covered to control odors and have a limited capacity. The current flow meter for the system is a temporary strap-on flow meter placed after the original flow meter and headwork's isolation gate failed. Because of the limited use of these clarifiers, the cost-effectiveness of a rehab will have to be evaluated.

Solids Pumping System
No issues require special attention.

Trickling Filter Pumps
The equipment is left over from an abandoned trickling filter system. Although it's not the original intent, the equipment is used occasionally to increase capacity of the Plant 2 system. The cylinder valve that controls the output of the pumps has corroded and failed requiring repair. A potential maintenance project will address this issue.

Biofilter
The biofilter was constructed on top of the old trickling filter infrastructure. There are several locations of the biofilter that leak. EN15019 should address these leaks as well as evaluate alternative technologies for odor control.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
<u>Plant 3</u>		
Influent Channel	1977 1982	Planned 14/15
Primary Clarifiers	1977 1982 2007 2013	
Effluent Channel	1977 1982 2014	
Sludge Pumping System	1977 1982	
Scum System	1977 1982 2013	
<u>Plant 2</u>		
Primary Clarifiers	1966 1987 1997	Planned 15/16
Solids Pumping System	1966 1985 1987	
Trickling Filter Pumps	1966	
Biofilter	2008 2013	

Table 4 Potential Projects

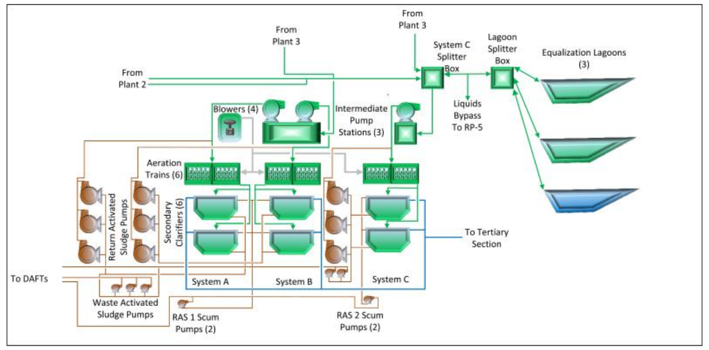
System	Project Name	Project Description
Trickling Filter Pumps	RP-1 Cylinder Valve Repairs	Repair the cylinder valve that controls the output of the Trickling Filter Pumps

System Summary Continued on Next Page

Asset Management System Summary – RP-1

Secondary Treatment Process

1. Asset Profile



Intermediate Pumps Stations
Primary effluent flows to the intermediate pump station wet wells. The wet wells can divert high flows to the flow equalization system. Three sets of pumps (System A – 3 pumps, System B – 3 pumps, System C – 4 Pumps) pump to each designated aeration system.

Flow Equalization System
Primary effluent can flow to three flow equalization lagoons to hold flows and introduce them back to the intermediate pump station at a later time. Flow is diverted to the three lagoons via motorized gates. Two lagoons have floating aerators to slow the rate at which the stored flows become septic.

Activated Sludge System
The three activated sludge systems consist of two aeration trains each (six total). Influent gates divert a combined flow of primary effluent and return activated sludge to each train. Each train consists of four basins. The first basin mixes flows with a paddle mixer. The next three basins can add air via the fine bubble diffusion system supplied by four large blowers with automated valves to control the dissolved oxygen concentrations such that biochemical oxygen demand and total inorganic nitrogen removals are optimized.

Secondary Clarifiers
Effluent from two aeration trains flows in a common channel to two circular clarifiers per system (six in total). Each peripheral feel clarifier has a rotating sludge and skimmer arm. Solids settle out of the liquid flow and are pushed to a center sludge hopper for pumping. Liquid overflows the V-notched weirs.

Return Activated Sludge (RAS) Pumping System
The settled sludge in the secondary clarifiers is pumped back to the influent of the aeration system as return activated sludge (RAS) to mix with primary effluent from the intermediate pump station. The organisms in the RAS must be returned to sustain the biological process. Also, the RAS flow returns nitrate for further removal. Each system has three dedicated pumps (nine in total). The return activated sludge and wasted activated sludge pumps are located inside two separate buildings: RAS 1 (Systems A and B) and RAS 2 (System C).

Waste Activated Sludge (WAS) Pumping System
The waste activated sludge (WAS) pumping system controls the activated sludge (biomass) concentrations in the aeration system. A portion of the settled solids from the secondary clarifiers is pumped out of the secondary system to solids processing as WAS.

Scum Pumping System
Scum collected by the skimmer arm of the secondary clarifiers is routed to two scum wells, where it is pumped out of the system to solids processing.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Secondary Treatment Process	50 MGD	
Intermediate Pump Station System A Pumps Valves System B Pumps Valves System C Pumps Valves Gates	 3 @ 4,200 gpm 60 hp 4 units 3 @ 5,600 gpm 75/60/60 hp 5 units 4 @ 5,600 gpm 75 hp 5 units 5 units	 Per Unit > 18-inch Per Unit > 18-inch Per Unit > 18-inch
Flow Equalization System Lagoon 1 Lagoon 2 Lagoon 3 Gates	 1 @ 5.8 MG 1 @ 6.2 MG 1 @ 10.3 MG 3 units	
Activated Sludge System Blowers System A & B Trains Depth Mixers System C Trains Depth Mixers Air Panels Gates Valve Valves (air)	 2 @ 14.1 MGD 1 @ 15.9 MGD 4 @ 13,426 scfm 700 hp 9.25 psig 4 @ 1.91 MG 17.8 ft 4 @ 15 hp 2 @ 1.96 MG 17.8 ft 2 @ 15 hp 142 per train 22 per train 1 per system 6 units	 Per Unit Per Unit Per Unit Per Unit Per Unit > 18-inch > 18-inch
Secondary Clarifiers System A & B System C	 4 @ 700 gpd/ft^2 11,310 ft^2 2 @ 700 gpd/ft^2 13,273 ft^2	 Per Unit Per Unit
RAS Pumping System RAS 1: Pumps RAS 2: Pumps Valves	 6 @ 5,600 gpm 60 hp 3 @ 5,600 gpm 60 hp 40 units	 Per Unit Per Unit > 14-inch
WAS Pumping System RAS 1: Pumps RAS 2: Pumps	 3 @ 450 gpm 7.5 hp 2 @ 600 gpm 7.5 hp	 Per Unit Per Unit
Scum Pumping System		
RAS 1 RAS 2	2 @ 400 gpm 2 @ 200 gpm	Per Unit Per Unit

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Intermediate Pump Stations	4	3	4	3
Flow Equalization System	3	3	3	3
Activated Sludge System	3	4	4	4
Secondary Clarifiers	3	4	3	3
RAS Pumping System	3	3	3	3
WAS Pumping System	3	3	3	3
Scum Pumping System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues

Intermediate Pump Stations
EN18004 will install new variable frequency drive technology to replace older clutch drives. The System C primary effluent splitter box concrete is corroding, and the gates are not functional. A potential engineering project is needed to address this area. Project EN15012 will replace the east primary effluent piping, including structure upgrades to System C.

Flow Equalization System
Recent crack-repair projects have eliminated the cracks in one of the lagoons. Operations and Maintenance staff monitor the status of cracks in the lagoons. Project EN19007 will provide odor control for the flow equalization system or will provide the ability to equalize secondary effluent.

Activated Sludge System
Leaks in the air ducting system will be addressed by Project EN12022 in 2014/5. A potential project will address upgrades to improve nutrient removal (e.g., mixed-liquor recirculation and anoxic mixers).

Secondary Clarifiers
A rehab of Clarifier No.1 and 2 was done in 2008. A potential project will rehab Clarifier No.5 and 6, including upgrading the weir and launder washing system for algae control.

Return Activated Sludge (RAS) Pumping System
A Maintenance project will address the rehab of valves and flow meters.

Waste Activated Sludge (WAS) Pumping System
The waste activated sludge piping clogs frequently. Flush water is provided; however, the plugging reduces process efficiency. Project EN15020 will address this issue.

Scum Pumping System
The scum discharge piping combines with flow from primary Plant 3 scum pumping system. When all the pumps are running at the same time, the pump station output decreases dramatically, reducing process reliability. This issue will be addressed by Project EN15020.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Intermediate Pump Stations	1977 1987	
Flow Equalization System	1977 1987 1995 2013	
Activated Sludge System	1977 1987 1997	
Secondary Clarifiers	1977 1987	1: Planned 15/16 2: Complete 14/15 3: Planned 15/16 4: Planned 15/16 5: Planned 15/16 6: Complete 14/15
RAS Pumping System	1977 1987	
WAS Pumping System	1977 1987	
Scum Pumping System	1977 1987	

Table 4 Potential Projects

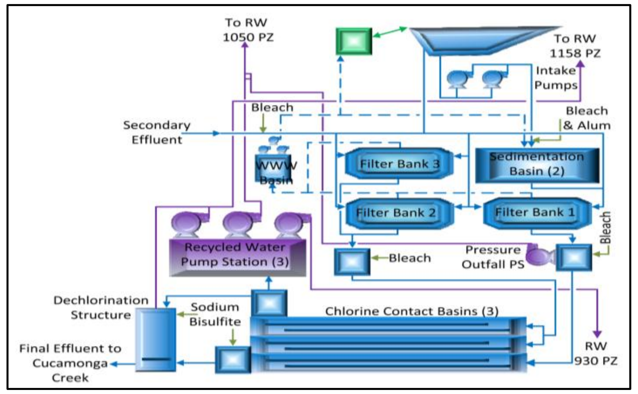
System	Project Name	Project Description
Activated Sludge System	RP1 MLR Pump Improvements	This project will install mixed liquor return pumps into the activated sludge system to improve nutrient removal.
Secondary Clarifiers	RP1 Secondary Clarifier Rehab	This project will rehab Clarifiers 5 and 6 and will upgrade the weir and launder washing system for algae control.
Plant Expansion	RP-1 Capacity Expansion	Expand existing RP-1 liquid and solids treatment capacity.

System Summary Continued on Next Page

Asset Management System Summary – RP-1

Tertiary Treatment Process

1. Asset Profile



Intake Pump Station
Secondary effluent is conveyed across the Cucamonga Creek through a 60-inch pipeline, which feeds the tertiary section or can be diverted to Lagoon 3. The intake pumps convey flow from Lagoon 3 to the sedimentation basin.

Aluminum Sulfate (Alum) System
The aluminum sulfate system consists of two large storage tanks, four pumps, piping, and appurtenances. Alum is added to the process at two locations: (1) flash mixer (FM) 1 and (2) flash mixer 2. FM-1 injects chemical into the main feed to the tertiary section. Alum is a coagulant that helps with the removal of suspended materials in the flow path. FM-2 injects alum to into the sedimentation basin influent flow, acting as a coagulant for the suspended material from the waste-wash water basin

Sedimentation Basin
The sedimentation basin can receive tertiary section drainage and filter backwash water from the waste-wash water basin. The flow is mixed with aluminum sulfate at FM-2 and introduced to the mixing tank. The solids in the flow coagulate and settle to the bottom of the tank. The collected solids are pumped to solids processing, while the overflowing liquid is sent to the filters.

Chlorination System
Three chemical tanks hold 12.5 percent bleach. Two pumps draw from the tanks to feed an injection point ahead of the filters at FM-1. Two additional pumps supply chlorine to a looped pipe system from the tanks to the filter effluent structures (OES and NES). The effluent structures each have a duty and standby peristaltic dosing pump. The duty pumps inject bleach through a mixer into the process streams. Chlorine residual is measured throughout the tertiary process to control the chlorine dose.

Filters
There are three filter banks, consisting of a total of 26 down-flow filters. The flow travels through layers of anthracite, sand, and gravel. The filters are regularly backwashed to remove the solids that have been filtered from the secondary effluent. Backwash water is sent to the waste-wash water basin and pumped back into the lagoons or sedimentation basin.

Waste-Wash Water (WWW) Basin
The waste-wash water (WWW) basin collects drainage from the entire tertiary section of RP-1 and also collects filter backwash and leakage from the three filter banks. The collected water is pumped by three pumps to: (1) equalization lagoons or (2) the sedimentation basin.

Filter Effluent Structures
Flow from the filters enters OES or NES. The structures are equipped with chlorine analyzers and peristaltic bleach pumps to maintain the chlorine residual set point at the end of each effluent structure. Chlorinated flow is conveyed to the chlorine contact basins.

Chlorine Contact Basin (CCB)
The chlorine contact basins (CCB) have a serpentine flow path that allows for the injected chlorine to gain contact time with the treated water to meet permit requirements. The contact basins are covered and have continuous monitoring of chlorine residual. Flow from all three contact basins merge into a common effluent channel and flow to the CCB splitter box.

Effluent Splitter Box
Flow entering the CCB splitter box is directed to the dechlorination structure, recycled water wet well, or the pressure outfall pipeline. Flow is controlled by gates.

Dechlorination System
Flow entering the dechlorination structures is dosed with sodium bisulfite (SBS) and travels through a serpentine flow path to allow for the SBS to neutralize any chlorine residual before flowing into Cucamonga Creek. SBS is stored in two large chemical tanks and is metered into the system via six chemical metering pumps.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Tertiary Treatment Process	44 MGD	
Intake Pump Station	2 @ 14,000 gpm 60 hp	Per Unit
Alum System Tanks Pumps	 2 @ 20,000 gallons 2 @ 20.25 gph 1 @ 32.20 gph 1 @ 58.50 gph	
Sedimentation Basin Total Weir Length Total Settling Tube Area Chemical Mixer Traveling Bridge Pump	 800 ft 7,600 ft^2 8 @ 3 hp 1 @ 1.5 hp 2 @ 130 gpm	
Filters Bank No.1 Bank No.2 & 3 Filter Loading Rate Valves	 8 @ 299 ft^2 18 @ 299 ft^2 5 gpm/ft^2 118 units	 Per Unit Per Unit 12 - 42-inch
Waste-Wash-Water Basin Pumps Valve	 3 @ 2,100 gpm 2 units	 Per Unit > 18-inch
Filter Effluent Structures Gate Valves	 4 units 2 unit	 > 18-inch
Chlorination System Tanks ME-18 Pumps OES Pumps NES Pumps Mixers	 3 @ 10,300 gal 2 @ 317 gph 2 @ 205 gph 2 @ 205 gph 3 water champs	 Per Unit Per Unit Per Unit Per Unit
Chlorine Contact Basins Gates Valves	3 @ 1.3 MG 6 units 1 unit	Per Unit >18-inch
Effluent Splitter Box Gates	 3 units	
Dechlorination System Tanks Pumps	 2 @ 12,500 gal 4 @ 9-90 gph 2 @ 2-20 gph	 Per Unit Per Unit Per Unit

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Intake Pump Station	3	3	3	3
Alum System	4	3	3	3
Sedimentation Basin	5	3	3	4
Chlorination System	4	3	4	4
Filters	3	3	3	3
Waste-Wash Water Basin	3	3	3	3
Filter Effluent Structures	4	3	3	3
Chlorine Contact Basins	3	3	3	3
Effluent Splitter Box	3	3	3	3
Dechlorination System	2	2	3	3

* Ratings as defined in Appendix A

4. Key Issues

Intake Pump Station
No issues require special attention.

Aluminum Sulfate (Alum) System
The main alum pumps feeding FM-2 have not been run since the sedimentation basin was taken offline. The pumps will be rehabilitated under project EN11039 in order to put the sedimentation basin back in service.

Sedimentation Basin
The sedimentation basin has not been in operation for several years after the sludge line to solids processing was found to be leaking. During this time the settling tubs were removed from one of the tanks. EN11039 will rehabilitate this system.

Chlorination System
Project EN11039 will upgrade this system to provide more efficient and effective chemical dosing for full post filtration.

Filters
The filters backwash valves leak continuously sending flow to the waste-wash water basin, where the flow must be pumped, resulting in process inefficiencies. Some of the observed underground pipe appears to have significant corrosion. A potential maintenance project will address the valve issue and rehab the internals components of the filters.

Waste-Wash Water (WWW) Basin
The increased on/off cycling of the WWW-basin pumps from the leaking filter-backwash valves results in significantly higher run time than expected. This problem will be addressed by a potential maintenance project.

Effluent Structures
Rails used to mount chemical mixing equipment are corroded and need repair. EN11039 will address this corrosion issue.

Chlorine Contact Basins (CCB)
A potential maintenance project will rehab these basins and address any leaks.

Effluent Splitter Box
No issues require special attention.

Dechlorination System
No issues require special attention.

Table 3 History of Select Assets

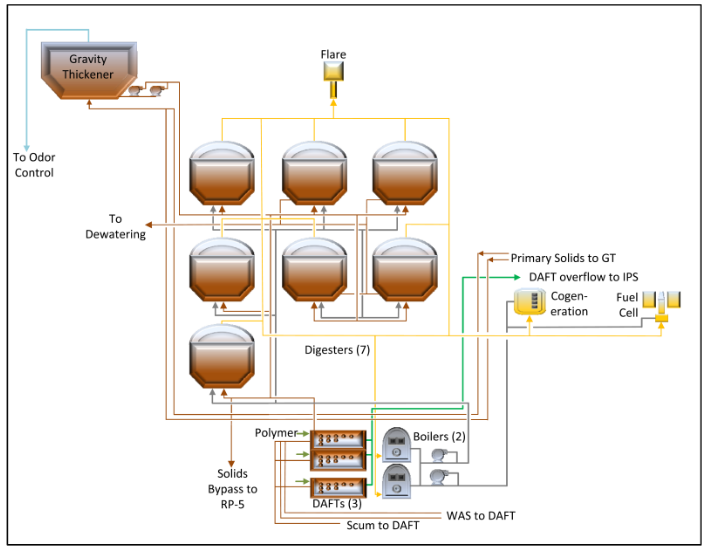
System	Capital Improvement Project Activity	Condition Assessment Report
Intake Pump Station	1977	
Alum System	1977 1998	
Sedimentation Basin	1977 1998	Planned 15/16
Chlorination System	1977 2004	
Filters	1977 1982 1987	Planned 15/16
Waste-Wash Water Basin	1977 1987	
Filter Effluent Structures	1977 1987	
Chlorine Contact Basins	1997	
Effluent Splitter Box	2002	
Dechlorination System	1992 2011	

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – RP-1
Solids Treatment Process
1. Asset Profile



Gravity Thickener System
Solids collected from the primary clarifiers are pumped to the gravity thickener (GT) and mixed with sweetener water supplied by the utility water system. Solids are allowed to settle to the bottom of the GT. Solids are increased from 1 percent total solids to 2 to 4 percent total solids. The thickened solids are pumped to the digestion system. The liquid overflow is conveyed back to the RP-1 headworks splitter box.

Dissolved Air Flotation Thickener (DAFT) System
The three DAFTs receive solids from the scum collection systems of the primary and secondary clarifiers and also receive waste activated sludge from the secondary system. Solids entering the DAFTs are mixed with recycled flow that has been pressurized with compressed air from two large compressors and dosed with polymer. Solids float to the top, where they are skimmed off and pumped to the digestion system. Solids are thickened from ~1 percent to 4 percent total solids through this process. The liquid underflow of the DAFT flows to the system C splitter box. A solids bypass allows for the diversion of solids to the regional collection system, which flows to RP-5.

Digestion System
Seven digesters receive thickened sludge. Digesters 1 and 2 have floating domes, while Digesters 3, 4, 5, 6, and 7 have fixed covers. The hot water system provides heat, and the sludge recirculation system transfers heat to maintain temperatures from 97 to 128 degrees Fahrenheit. Each recirculation system is equipped with a grinder. Gas-mixing systems mix the contents of the digesters. Gas piping connected to the top of each digester allows the produced gas to enter the gas conveyance system. Several pressure/vacuum relief valves and J-tube safety blow-offs are on each digester to prevent over and under pressurization.

Sludge Transfer System
To allow for phased digestion, RP-1 is equipped with several pump stations and automated valves to transfer sludge throughout the digestion system. The transfer system is designed to offer the greatest flexibility of transferring sludge to each of the seven digesters. Valves are operated from a centralized compressed air system.

Hot Water System
The hot water system consists of two loops: (1) primary (heating) and (2) secondary (delivery). The primary loop collects heat from heat exchangers at the boilers and the fuel cell (note: fuel cell owned by private firm). The secondary loop pulls heated water from the primary loop and sends it to the heat exchangers at each digester. Two boilers are fueled by digester or natural gas, or both. The cogeneration heat exchangers collect heat from the water jacket and the exhaust of the cogeneration engines when the engines are in service. The fuel cell has a heat exchanger on the exhaust stack that collects waste heat.

Gas Conveyance and Waste Gas System
Gas collected from the digestion system enters the gas loop, which can deliver low-pressure gas to the compressors for use in the boiler or fuel cell or to the flare. The gas loop has several J-tubes to prevent over-pressurization. Iron sponges are used to remove hydrogen sulfide from the digester gas. Digesters 1 and 2 have a waste gas line that can deliver low-methane content gas directly to the flare.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Solids Treatment Process	60 MGD	
GT System Tank Drive Pumps	 1 @ 299 gal/ft^2/day 3,848 ft^2 1 @ 1.0 hp 2 @ 150 gpm 15 hp	 Per Unit Per Unit
DAFT System Tanks Recirculation Pumps Sludge Pumps Polymer Blending Units Pressurization Tanks Compressors	 3 @ 85 gal/ft^2/day 2,100 ft^2 3 @ 1,260 gpm 6 @ 200 gpm 4 @ 8.0 gph 3 @ 2,000 gal. 2 @ 40 hp	 Per Unit Per Unit Per Unit Per Unit Per Unit Per Unit
Digester System Digester No.1 & 2 Digester No.3 & 4 Digester No.5 Digester No.6 & 7 Recirc. Pumps Heat Exchangers Tube in Tube Spiral Gas Mixers	 2 @ 112,122 ft^3 2 @ 99,500 ft^3 1 @ 172,995 ft^3 2 @ 224,332 ft^3 5 @ 600 gpm 30 hp 2 @ 500 gpm 30 hp 1 @ 6.0 MMBTU/hr 6 @ 1.5 MMBTU/hr 4 @ 504 SCFM 30 hp 3 @ 3,839 SCFM 70 hp	 Per Unit Per Unit Per Unit Per Unit Per Unit Per Unit Per Unit Per Unit
Sludge Transfer System Transfer A Pumps Transfer B Pumps	 2 @ 400 gpm 6 @ 400 gpm	 Per Unit Per Unit
Hot Water System Boiler Fuel Cell Primary Loop Pumps Secondary Loop Pumps	 2 @ 10.5 MMBTU/hr 1 @ 4.4 MMBTU/hr 2 @ 25 hp 900 gpm 3 @ 15 hp 550 gpm	 Per Unit Per Unit Per Unit
Gas Conveyance System Flare Iron Sponges	 1 @ 40,000 SCFH 2 @ 210 ft^3 1 @ 546 ft^3 1 @ 350 ft^3	 Per Unit

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Gravity Thickener System	3	5	3	3
DAFT System	3	3	3	3
Digester System	3	3	3	3
Sludge Transfer System	2	2	2	3
Hot Water System	3	3	3	3
Gas Conveyance System	4	3	4	3

* Ratings as defined in Appendix A

4. Key Issues

Gravity Thickeners System
Currently, the gravity thickener is heavily loaded, and regular upsets require the diversion of primary solids to the DAFT system or the bypass system. A potential project will address optimizing the current thickening system or addressing alternative sludge thickening methods.

Dissolved Air Flotation Thickeners (DAFT) System
A potential project will address upgrades to this system. Project EN15013 will replace above-ground sludge piping to the digester system.

Digester System
Maintenance has an established regimen to clean and rehab one digester a year to remove collected grit, replace piping, install new seals, and maintain critical pieces of equipment. A potential engineering project will upgrade the mixing systems in 5–10 years. Digester No 4's dome is currently being recoated under maintenance project EP15001. The exterior coating of Digesters 6 and 7 are starting to experience failures and will be repaired by a maintenance project.

Sludge Transfer System
The sludge transfers system was designed to be robust. However, during phased digester with an acid phase digester online, there is a single point of failure on the main transfer pump from the first/acid phase to the second phase digesters. Project EN2006 will upgrade the mixing systems in 5–10 years.

Hot Water System
To meet the strict emission requirements of the Southern California Air Quality Management District, the Agency installed new boilers in FY2012/13. The fuel cell heat exchanger was also installed in FY2012/13. The new additions and limited time of operations have posed challenges for operations related to the controls of the boiler system.

Gas Conveyance System
Project EN13046 will upgrade the flare system and piping system to ensure adequate control of the digester gas pressures. Project PA140001 will replace the iron sponges at the Energy Recovery Building that are starting to deteriorate. A potential project is needed to size the digestion flare system to meet peak digester gas projection.

Table 3 History of Select Assets

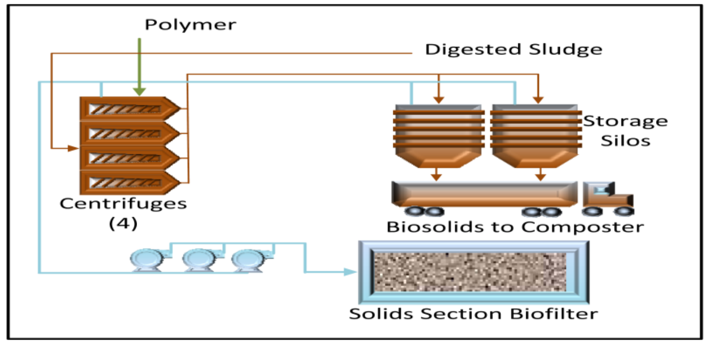
System	Capital Improvement Project Activity	Condition Assessment Report
Gravity Thickener System	1987	2013
DAFT System	1977 1987	
Digester System	1975 1977 1985 1982 1992 1999 2008	1: Complete 2010 2: Complete 2010 4: Complete 2014
Sludge Transfer System	2008	
Hot Water System	1977 1985 2012	
Gas Conveyance System	1975 1985 2008	Planned 15/16

Table 4 Potential Projects

System	Project Name	Project Description
Gravity Thickener System and DAFT System	RP-1 Sludge Thickening Upgrades	Project to upgrade the sludge thickening processes for primary and secondary sludge.
Digester System	Digester Cleaning and Rehab	The Agency has established an Agency-wide digester annual cleaning and rehabilitation regimen to remove solids and inorganics collected at the bottom of the digesters, replace valves, install new seals, and maintain critical pieces of equipment. Include in Agency-wide TYCIP.
Gas Conveyance System	RP-1 Flare Improvements	RP-1 Flare improvements and gas system upgrades.

System Summary Continued on Next Page

Asset Management System Summary – RP-1
Dewatering Treatment Process
1. Asset Profile



Sludge Grinding System
Two inline grinders ensure that large solid objects in the sludge flow are broken up into small pieces to limit the possibility of large objects causing obstructions in downstream piping or equipment.

Sludge Feed Pump System
Four rotary lobe pumps pull sludge from the grinders and pumps flow to the influent of the centrifuges. The sludge pumps are variable speed with flow meters, instrumentation, and controls. A series of cross-connects in the pump discharge piping allows for sludge pumps to feed different centrifuges.

Polymer Blending System
Totes of polymer are transferred to a large day tank via two rotary lobe transfer pumps. Four polymer blending units meter polymer and dilution water to a mixing chamber. The discharge of the polymer blending unit is conveyed through a network of pipes and cross connection valves to three separate dosing points in the sludge piping.

Centrifuge System
The sludge flow mixed with polymer enters the feed tube of the centrifuge and discharges into a spinning bowl. The centrifugal force of the spinning bowl forces the heavier solids to the edge of the bowl and the centrate to rest on top of the solids. A scroll, spinning slightly faster than the bowl, scrapes the solids around the edge of the bowl to one end of the centrifuge, up a beach, and into the discharge shoot to the conveyor. The bowl has dam plates to maintain a depth of centrate until it overflows at the other end to the centrate wet well.

Conveyor System
Two separate screw conveyor systems, configured in parallel, collect dewatered solids (cake) from each centrifuge. Solids are diverted to each system via a diverter gate and then through a series of shaftless screws until solids are discharged into the storage silos.

Storage Silo System
Solids from the conveyor system are dropped into two separate storage silos. The silos hold collected cake until a loading sequence is initiated, and solids are dropped through a series of gates and discharge screws into a truck trailer for hauling to an offsite facility.

Centrate and Drainage Pump System
Centrate collected from the centrifuge operation is conveyed to the centrate pump station where it is pumped to the Non-Reclaimable Wastewater System. The centrate pumps are variable speed to maintain a wet well level. Process flows generated during centrifuge startup and shutdown are conveyed to the drainage pump station, where they are pumped back into the RP-1 process by constant speed drainage pumps.

Anti-Struvite System
Five pumps pull chemical from a storage tote and inject into the centrate pipes of each centrifuge and the centrate wet well. The chemical inhibits Struvite formation that forms naturally in centrate and adheres to walls of downstream piping.

Odor Control/Biofilter System
Three blowers pull foul air from the gravity thickener, miscellaneous sumps, and either the belt press or centrifuge buildings, forcing the air through a bed of carbon-rich media to allow for the biological consumption of hydrogen sulfide and other compounds.

2. Capacity Profile
Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Dewatering Treatment Process	60 MGD	
Sludge Grinding System	2 @ 10 hp	Per Unit
Sludge Feed System Pump	4 @ 360 gpm	Per Unit
Polymer System Blending System	4 @ 5 to 30 gph	Per Unit
Centrifuge System Centrifuge	4 @ 360 gpm	Per Unit
Conveyor System	2 trains w/ 5 conveyors ea. from 7.5 to 30 hp	
Storage Silo System	2 @ 5,636 ft^3	Per Unit
Centrate Pump System Drainage Pump System	3 @ 450 gpm 2 @ 450 gpm	Per Unit Per Unit
Anti-Struvite System Pump	4 @ 4.0 gpm 1 @ 8 gpm	Per Unit
Odor Control/Biofilter System Blower Media Depth Valves	1 @ 4,600 scfm 2 @ 13,700 scfm 5 ft 10 units	Per Unit > 18-inch

3. Asset Ratings
Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Sludge Grinding System	1	3	3	3
Sludge Feed Pump System	1	2	3	3
Polymer Blending System	3	2	3	4
Centrifuge System	1	2	3	3
Conveyor System	1	3	4	3
Storage Silo System	1	3	3	3
Centrate and Drainage Pump System	1	3	3	3
Anti-Struvite System	1	2	3	3
Odor Control/Biofilter System	3	3	4	3

* Ratings as defined in Appendix A

4. Key Issues

Sludge Grinding System
No issues require special attention.

Sludge Feed Pump System
No issues require special attention.

Polymer Blending System
The current polymer blending units are no longer being supported by the manufacturer, and small linkages that control water valves failure regularly. A potential project will review the potential replacement or modification to these systems.

Centrifuge System
The Centrifuge System will be evaluated in 2015 to assess the effectiveness of the Anti-Struvite System.

Conveyor System
The inclined conveyors have been determined to be inaccessible for routine maintenance. Engineering project EN06015 is currently addressing these access issues.

Storage Silo System
No issues require special attention.

Centrate Drainage Pump System
No issues require special attention.

Anti-Struvite System
No issues require special attention.

Odor Control/Biofilter System
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Sludge Grinding System	2013	
Sludge Feed Pump System	2013	
Polymer Blending System	2013	
Centrifuge System	2013	Planned 15/16
Conveyor System	2013	Planned 17/18
Storage Silo System	2013	Planned 17/18
Centrate and Drainage Pump System	2013	Planned 17/18
Anti-Struvite System	2013	Planned 17/18
Odor Control/Biofilter System	2003	Planned 17/18

Table 4 Potential Projects

System	Project Name	Project Description
RP-1 Centrifuge Polymer Blending Units	RP-1 Poly Blending Units Replacement	This project will replace the polymer blending units at the RP-1 Centrifuge Building.

System Summary Continued on Next Page

Asset Management System Summary – RP-1
Auxiliary Systems
1. Asset Profile

RP-1 Plant Drain
The RP-1 plant drain collects and pumps surface runoff from storm events, wash-down water, and drains some of the treatment plants tanks and processes in the preliminary, primary, secondary, solids, and dewatering sections. The drain system receives gravity flows to a wet well, where it is pumped to the System C splitter box.

TP-1 Plant Drain
The TP-1 plant drain collects and pumps surface runoff from storm events, wash-down water, and drains TP-1 tanks and processes in the tertiary section. The drain system receives gravity flows to a wet well, where it is pumped to the waste-wash water basin. A second pump station (West Wind Storm Water Pump Station) collects surface runoff and pumps water to the main TP-1 Plant Drain wet well.

Electrical System
The electrical energy to power the treatment facility is obtained from the local electrical grid (SCE) and onsite energy generation (solar, fuel cell, and emergency generators). The solar and fuel cell assets are owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the RP-1 Power Reliability Building, where transformers and switchgear are located to distribute electrical energy throughout the facility. A single line diagram of the RP-1 electrical system is shown in Appendix B.

Diesel emergency generators are used in the event of a power failure. Three generators are located in the Energy Recovery Building and supply power to the preliminary, primary, secondary, solids and dewatering sections. One generator supplies power to the tertiary section. A final generator supplies power to the Dechlorination System.

An extensive lighting system is needed to illuminate the facility during dark hours. Most lighting fixtures are equipped with light sensors to turn off when sufficient lighting is provided from the sun. Lighting units are inside each of the process buildings, on equipment walls, and along the roadways for safety.

Utility Water System
Utility water is used for cleaning, supplying pump seal water, cooling, dilution, flushing of clogged pipes, irrigation, and other inner plant uses. The system can be supplied by the 1050-foot pressure zone pump station or the pressure outfall (PO) pump station. The PO pump station is operated on occasion during shutdowns and other activities to supply process water to the treatment plant. The utility water system piping consists of several isolation valves and point-of-use connections.

Potable Water System
Potable water is used throughout the plant for restrooms, cooling, odor scrubber dilution water, fire suppression, and more. The system is supplied from a service on Philadelphia Street and another service on Walnut Avenue from the city of Ontario. The system has several backflow devices to protect the drinking water system.

Instrumentation and Control System
An extensive array of instruments is used to monitor and control the processes at RP-1. Nearly all of the processes at the plant are observed and controlled from a centralized control system known as the Supervisory Control and Data Acquisition or SCADA system. Control wiring and local panels are provided at individual pieces of equipment, and control wiring transmits data to three main control terminals at (1) Main Control Building, (2) Dewatering Building, and (3) the Tertiary Control Building.

Yard Piping
A substantial network of pipes is used to convey flows between unit processes. The material, sizes, and service conditions of these pipes vary widely. A yard piping diagram is show in Appendix C.

2. Capacity Profile
Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-1 Plant Drain	2 @ 1,585 gpm 40 hp	
TP-1 Plant Drain	2 @ 1,000 gpm 15 hp	
Electrical System Utility Voltage Transformers Switchgear Distribution RP-1 Generator TP-1 Generator Dechlorination Generator Mounted Lighting	 12 kV 12 kV to 480 V 2 @ 12 kV to 4,160 V 1 @ 12 kV 22 @ 480 V 1 @ 4160 V 3 @ 1,250 kW 1,801 Bhp 1 @ 670 kW 896 Bhp 1 @ 30 kW > 145 units	 MCCs MCCs
Utility Water System Pipelines Pressure Outfall Pump Station	 Various sizes 3 @ 800 gpm 2 @ 1500 gpm	
Potable Water System Backflow Devices	 31 units	
Instrumentation and Control System HMI Workstations PLC I/O Hub Radio Transmitter	 6 Units 16 Units 1 unit	
Yard Piping	See Appendix C	

3. Asset Ratings
Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
RP-1 Plant Drain	3	3	3	3
TP-1 Plant Drain	4	4	4	4
Electrical System	4	4	3	3
Utility Water System	4	3	4	4
Potable Water System	3	3	4	3
Instrumentation and Control System	3	3	3	3
Yard Piping	TBD	3	3	3

* Ratings as defined in Appendix A

4. Key Issues
RP-1 Plant Drain
No issues.

TP-1 Plant Drain
The West Wind Storm Water pumps Station has experienced pump failures. Intense rainfall events have overwhelmed the low capacity pumps station. Several factors can be attributed to the low capacity; inadequate pump sizing, small pump discharge piping and obstructions that clog pumps/piping limiting flow.

Electrical System
Project EN13048 will address the installation of a second 12 kV feeder from the power reliability building to TP-1. Additional information for this project can be found in the asset summary section for recycled water.

The System C main control computer (MCC) panel is located outdoors. Maintenance is planning a project to rehab and provide protection for the MCC.

The Plant 3 primary MCC is aging and no longer supported by the manufacturer. Maintenance is planning a project to rehab and replace the MCC.

Lighting rehab and improvements are being evaluated and implemented by the Engineering Department.

Recent investigation into the backup generator switchgear has indicated the controls are near the end of their useful life. EN13048 will be evaluating a potential project to repair/replace these controls.

Utility Water System
A potential maintenance project will rehab deteriorated portions of this system. Underground piping in the Digester area has failed and temporary above ground hoses are currently being used to supply needed uses. A potential project is needed to fix this piping.

The pressure outfall pump station is minimally maintained since the 1050 RW pumps are used to supply utility water throughout RP-1.

Potable Water System
A potential maintenance project will rehab deteriorated portions of this system.

Instrumentation and Control System
The control system will be updated in 2017 as part of Project EN13016.

Yard Piping
A 2011 condition assessment of the secondary effluent piping showed it to be in good condition. Observations suggest that piping around preliminary, primary, and solids processes that do not run full may have significant deterioration. Condition assessment planned for 2014 will determine the scope of a potential maintenance project to rehab this system.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
RP-1 Plant Drain	1999	
TP-1 Plant Drain	2001	
Electrical System	1994	
Lighting	1977	2011
Utility Water System	1977	
Potable Water System	1977	
Instrumentation and Controls	1977	
Yard Piping	1977	Planned 2014

Table 4 Potential Projects

System	Project Name	Project Description
Plant Utility and Potable Water Systems	RP-1 Utility/Potable Water Rehab	This project will provide replacement pipe and valves for an aging conveyance system within RP-1.

End of System Summary

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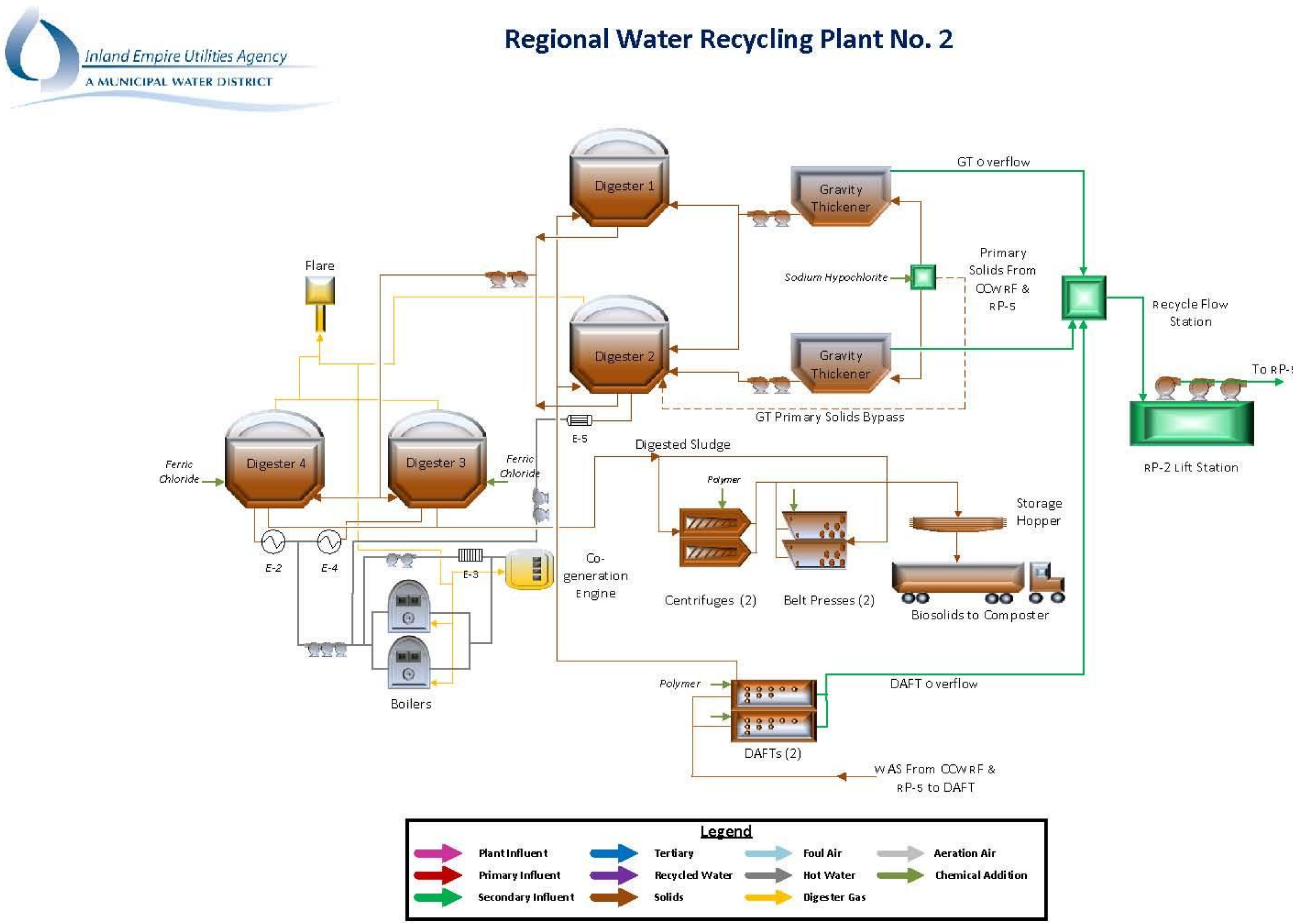

Figure 7-2: Regional Water Recycling Plant No. 2 (RP-2) – Schematic

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Table 7-3: Regional Water Recycling Plant No.2 – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 10-17-2014
(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)
(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

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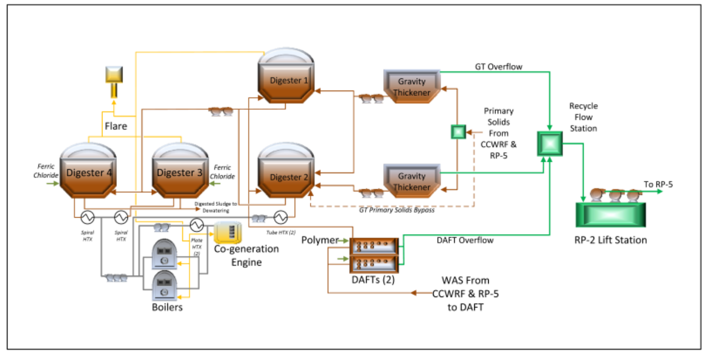
Asset Management System Summary – RP-2
Solids Treatment Process
1. Asset Profile



Gravity Thickener (GT) System START HERE
The gravity thickener (GT) distribution box receives primary clarifier sludge and scum from Carbon Canyon Water Recycling Facility (CCWRF) and RP-5 and distributes flow to GT #1 or #2 or both. Sodium hypochlorite may be introduced to the GT if needed from a 1600-gallon storage tank onsite. Solids are allowed to settle at the bottom of the GT. Solids are increased from ~1 percent total solids (TS) to ~4 percent TS. The thickened solids are then pumped to the digestion system.

Dissolved Air Flotation Thickener (DAFT) System
The DAFT system consists of two circular tanks. Waste activated sludge from the secondary system from CCWRF and RP-5 enters the DAFT and is mixed with recycled flow that has been pressurized with compressed air and dosed with polymer. Solids float to the top, where they are skimmed off and pumped to the digestion system. Solids are thickened from 1 percent TS to 4 percent TS. The overflow of the DAFT flows to the recycle flow station. Flow from the recycle flow station flows to the RP-2 lift station, where it is returned to the RP-5 headworks.

Digestion System
The digestion system consists of three anaerobic digesters and one aerobic digester. Digester 1 is operated only when capacity is limited. Digester 2 is a fixed-dome acid anaerobic digester and receives thickened sludge from the GT and DAFT systems. Digested sludge from Digester 2 is transferred to Digesters 3 and 4. Digesters 3 and 4 are floating-dome digesters and may be fed in series or parallel depending on the mode of operation. Plate and frame heat exchangers from the hot water system and recirculation pumps maintain temperatures from 97 to 128 degrees Fahrenheit. Gas mixers recirculate digester gas and use it to mix the digesters' sludge content with gas cannon mixers. Gas piping connected to the top of each digester allows the digester gas produced to enter the gas conveyance system. Several pressure vacuum regulated valves and J-tube safety blow-offs are installed on each digester to prevent over-pressurization.

Sludge Transfer System
RP-2 is equipped with several pumps and automated valves to transfer sludge through the digestion system.

Hot Water System
The hot water system generates heat in the boilers and cogeneration engines. Two boilers are fueled by digester or natural gas or both. Two tubes in tube heat exchangers are dedicated to heat Digester 2 and two spiral heat exchangers are dedicated to Digesters 3 and 4.The hot water is pumped into a hot water loop, where heat exchangers are used to heat the digestion system.

Gas Conveyance and Waste System
Digester gas collected from the digestion system enters the gas loop and is used for sludge mixing, fuel for boiler, and engine co-generation, or could be wasted to a waste gas burner (flare) when excess gas is in the system. The digester gas may be stored in either a low- or high-pressure tank. Gas compressors are used to compress digester gas into the high-pressure tank. The gas loop has several J-tubes and pressure-vacuum relief valves to prevent over-pressurization. An iron sponge using ferric oxide-impregnated media is used to reduce the hydrogen sulfide content in the gas of Digester 2 before entering the gas loop.

RP-2 Lift Station
The RP-2 lift station collects raw sewage from the Mountain Avenue interceptor, Chino Institute for Women (CIW) sewer, Butterfield force main, and recycle flows from the solids treatment facilities at RP-2, and discharges through a 24-inch pipeline to the RP-5 headworks.

Gas Conveyance and Waste Gas System
Gas collected from the digestion system enters the gas loop, which can deliver low-pressure gas to the compressors for use in the boiler or fuel cell or to the flare. The gas loop has several J-tubes to prevent over-pressurization. Iron sponges are used to remove hydrogen sulfide from the digester gas. Digester 2 has a waste gas line that can deliver low-methane-content gas directly to the flare.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Solids Treatment Process	26.4 MGD	
GT System Tank Drive Pumps	 2 @ 760 gpd/ft^2 1,590 ft^2 2 @ 10 hp 210 gpm 15 hp	 Per Unit Per Unit
DAFT System Tanks Recirculation Pumps Sludge Pumps Polymer Blending Units Compressors	 2 @ 25 gpd/ft^2 707 ft^2 5 @ 40 hp 3 @ 210 gpm 10 hp 2 @ 8.0 gph 4.5 hp	 Per Unit Per Unit Per Unit Per Unit
Digester System Digester No.1 & 2 Digester No.3 & 4 Recirc. Pumps Heat Exchangers Tube in Tube Spiral Plate Gas Mixers	 2 @ 489,565 gallon 2 @ 1.79 MG 3 @ 530 gpm 10 hp 3 @ 412 gpm 15 hp 2 @ 2.5 MMBTU/hr 2 @ 2.0 MMBTU/hr 2 @ 2.6 MMBTU/hr 3 @ 200 SCFM 25 hp	 Per Unit Per Unit Per Unit Per Unit Per Unit Per Unit Per Unit Per Unit
Sludge Transfer System Digester No.2 Pumps Digester 3 & 4 Pumps	 2 @ 300 gpm 15 hp 2 @ 500 gpm 25 hp	 Per Unit Per Unit
Hot Water System Boiler Hot Water Pumps	 1 @ 3.1 MMBTU 1 @ 3.7 MMBTU 2 @ 400 gpm	
Engine Recovery	3 @ 500 gpm 2 @ 640 gpm 2.15 MMBTU/hr 2.68 MMBTU/hr	
Gas Conveyance System Waste Gas Burner Iron Sponges Gas Compressors	 1 @ 350 ACFM 12.6 MMBTU/hr 1 @ 224 ft^3 2 @ 60 hp 1 @ 50 hp	
RP-2 Lift Station Pumps	 3 @ 3,300 gpm 100 hp	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
GT System	3	3	4	3
DAFT System	3	3	3	3
Digester System	3	3	3	3
Sludge Transfer System	3	3	3	3
Hot Water System	3	3	3	3
Gas Conveyance System	3	3	3	3
RP-2 Lift Station	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Gravity Thickeners System
Rags and large debris pass through the influent distribution box and into the GT influent center-feed columns, where frequent clogging occurs.

DAFT System
No issues require special attention.

Digester System
The RP-2 digester system is aging, and the associated equipment has undergone increased wear and tear. The Agency Maintenance Department has established an agency-wide digester annual cleaning and rehabilitation regimen to remove solids and inorganics collected at the bottom of the digesters, replace valves, install new seals, and maintain critical pieces of equipment.

Sludge Transfer System
No issues require special attention.

Hot Water System
No issues require special attention.

Gas Conveyance System
No issues require special attention.

RP-2 Lift Station
No issues require special attention.

Table 3 History of Select Assets

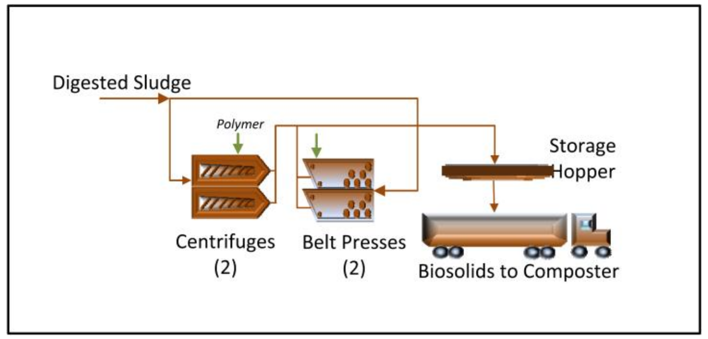
System	Capital Improvement Project Activity	Condition Assessment Report
GT System	1971 1988 2009	
DAFT System	1988	
Digester System	1960 1971 1979 1988 2003 2009 2011 2014	Dig. 3 – 2011 Dig. 4 – 2013
Sludge Transfer System	1979 1988 2003	
Hot Water System	1988 2003 2013	
Gas Conveyance System	1988 2003	
RP-2 Lift Station	2004	

Table 4 Potential Projects

System	Project Name	Project Description
Digester System	Digester Cleaning and Rehab	The Agency has established an Agency-wide digester annual cleaning and rehabilitation regimen to remove solids and inorganics collected at the bottom of the digesters, replace valves, install new seals, and maintain critical pieces of equipment. Include in Agency-wide TYCIP.

System Summary Continued on Next Page

Asset Management System Summary – RP-2
Dewatering Treatment Process
1. Asset Profile



Sludge Grinding System
Digested sludge from Digesters 3 and 4 pass through dedicated sludge grinders before the sludge enters the dewatering feed pumps. Three inline grinders ensure that large solid objects are broken up into small pieces to limit the possibility of plugging downstream piping or equipment.

Sludge Feed Pump System
Three sludge feed pumps pump sludge to the belt press system or the Centrifuge System, or both. The sludge pumps are variable speed with flow meters, instrumentation, and controls.

Polymer Blending System
The dewatering polymer system consists of three chemical metering pumps, three polymer blending units, and static mixers to mix the polymer with the sludge. Polymer is delivered in totes and pumped by the chemical metering pumps, mixed with dilution water, and dosed to the sludge flow.

Belt Press System
The RP-2 belt press system consists of two belt filter presses. A feed box receives sludge flow mixed with polymer and spreads flow across the width of a rotating porous belt. The sludge flow on the belt passes through a series of wedges that separate the sludge and allow collected filtrate to pass through the belt to a drip pan that is piped to the filtrate and centrate pumping system. The sludge flow then passes through the pressured zone, where sludge is pressed between two belts and allowed to drain. The compressed sludge then passes over a series of rollers that squeeze out remaining filtrate to drip pans. The belts then separate, and two scraper blades scrape the dewatered solids (cake) off of each belt, dropping the processed cake on to the conveyor system. Wash-water pumps supply water to spray each belt with high-pressure water to prevent the porous belts from clogging.

Centrifuge System
The sludge flow mixed with polymer enters the feed tube of the centrifuge and discharges into a spinning bowl. The centrifugal force of the spinning bowl forces the heavier solids to the edge of bowl and centrate to rest on top of the solids. A scroll spinning, slightly faster than the bowl, scraps the solids around the edge of the bowl to one end of the centrifuge, up a beach and into the discharge shoot to the conveyor. Dam plates near the center of the spinning bowl hold a depth of centrate until it overflows the opposite end of the centrifuge where it is piped to the centrate wet well.

Conveyor System
Two belt press conveyors transfer cake from the discharge of each belt press and then transfer the collected solids up to the top of the cake hopper. Six shaftless screw conveyors transfer cake from the discharge of each centrifuge to a common belt conveyor. The dewatered cake then travels up to the cake hopper, where it is distributed evenly on the trailer of a sludge hauling truck.

Cake Hopper
The cake hopper receives cake from the conveyor system and holds the cake until a loading sequence has been initiated to discharge the solid cake to a truck trailer for hauling to an offsite facility.

Filtrate and Centrate Pump System
Filtrate and centrate collected from the belt press and centrifuge processes are conveyed to a common wet well where they are pumped into the RP-2 lift station wet well and discharged to RP-5.

2. Capacity Profile
Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Dewatering Treatment Process	30 MGD 211K wet tons per year	
Sludge Grinding System	3 @ 210 gpm	
Sludge Feed System Pump	 3 @ 210 gpm 10 hp	
Polymer Blending System Polymer Pump Dilution	 3 @ 8.0 gph 3 @ 1200 gph	
Belt Press System Belt Press Wash-water pump	 2 @ 150 gpm 1,700 dry lbs/hr 3 @ 100 gpm 7.5 hp	
Centrifuge System Centrifuge Main Drive Back Drive	 2 @ 325 gpm 1,200 hp 40 hp	
Conveyor System Belt Conveyor Screw Conveyors	 2 @ 44,000 lbs/hr 1 @ 350 ft^3/hr 3 hp 3 @ 700 ft^3/hr 3 hp 2 @ 700 ft^3/hr 7.5 hp 1 @ 1600 ft^3/hr 15 hp	
Cake Hopper	1 @ 1,956 ft^3	
Filtrate and Centrate Pump Station Pumps	 2 @ 480 gpm, 7.5 hp	

3. Asset Ratings
Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Sludge Grinding System	3	3	3	3
Sludge Feed Pump System	3	3	3	3
Polymer Blending System	3	3	3	3
Belt Press System	3	3	3	3
Centrifuge System	3	3	3	3
Conveyor System	3	3	3	3
Cake Hopper	3	3	3	3
Filtrate and Drainage Pump Station	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation
Sludge Grinding System
No issues require special attention.

Sludge Feed Pump System
No issues require special attention.

Polymer Blending System
No issues require special attention.

Belt Press System
No issues require special attention. The belt presses were rehabilitated in 2013.

Centrifuge System
No issues require special attention.

Conveyor System
No issues require special attention.

Cake Hopper
No issues require special attention.

Filtrate and Centrate Pump System
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Sludge Grinding System	1988	
Dewatering Sludge Feed Pump System	1988	
Polymer Blending System	1979 1988 2011	
Belt Press System	1979 1988 2013	
Centrifuge System	2001	
Conveyor System	1979 1988 2008	
Cake Hopper	1988 2008	
Filtrate and Centrate Pump Station	1979 1988	

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – RP-2
Auxiliary Systems
1. Asset Profile

Plant Drain
The plant drain collects surface storm runoff, excess irrigation, and wash-down water collected in submersible drains located throughout the facility. The drain system receives gravity flows throughout the facility and is pumped to the RP-2 lagoon, the RP-2 lift station and finally to RP-5 headworks.

Electrical System
The electrical energy to power the treatment facility is obtained from the local electrical grid (SCE and Direct Access) and onsite co-generation. The electrical feed from the grid is composed of two 12 kV feeders to the power panel switchgear, where transformers and switchgear are located to distribute electrical energy throughout the facility. A single line diagram of the RP-2 electrical system is shown in Appendix B.

A 300 kW diesel emergency generator is used in the event of a power failure to power the RP-2 lift station.

Utility Water System
Utility water is used throughout the facility to clean, supply pump seal water, cool, dilute, flush clogged pipes, irrigate, and more. The system is supplied by the pump station. The piping consists of several isolation valves and point-of-use connections.

Potable Water System
Potable water is used throughout the plant for restrooms, cooling, odor scrubber dilution water, fire suppression, and more. The system is supplied from a service on a potable line off El Prado Rd. from the City of Chino. The system has several backflow devices to protect the drinking water system.

Instrumentation and Control System
An extensive array of instruments is used to monitor and control the processes at RP-2. Nearly all the processes at the plant are observed and controlled from a centralized SCADA system. Control wiring and local panels are provided at individual pieces of equipment, and control wiring transmits data to three main control terminals at RP-2.

Yard Piping
A substantial network of pipes is used to convey flows between unit processes. The material, sizes, and service conditions of these pipes vary widely. A yard piping diagram is show in Appendix C.

2. Capacity Profile
Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Plant Drain	2 @ 200 gpm	
Electrical System Utility Voltage Transformers Switchgear Distribution Co-Generator Generator	 2 @12 kV 2 @ 12 kV to 480 V 2 @12 kV 5 @ 480 V 1 @ 580 kW 1 @ 600 kW 1 @ 300 kW	
Utility Water System Pipelines Pump Station Valves	 Various sizes Fed from RP-5 PS >10 units	
Potable Water System Backflow Devices	 >10 units	
Instrumentation and Control System HMI Workstation RTU PLC I/O Hub Radio Transmitter		
Yard Piping	See Appendix C	

3. Asset Ratings
Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Plant Drain	3	3	3	3
Electrical System	3	3	3	3
Utility Water System	3	4	3	3
Potable Water System	3	3	3	3
Instrumentation and Control System	3	3	3	3
Yard Piping	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation
Plant Drain
No issues require special attention.

Electrical System
No issues require special attention.

Utility Water (UW) System
No issues require special attention.

Potable Water System
No issues require special attention.

Instrumentation and Control System
No issues require special attention.

Yard Piping
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Plant Drain	1979	
Electrical System	1979 1988 2008	
Utility Water System	2004	
Potable Water System	1979	
Instrumentation and Control System	1979 1988 2008	
Yard Piping	1979 1988	

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

End of System Summary

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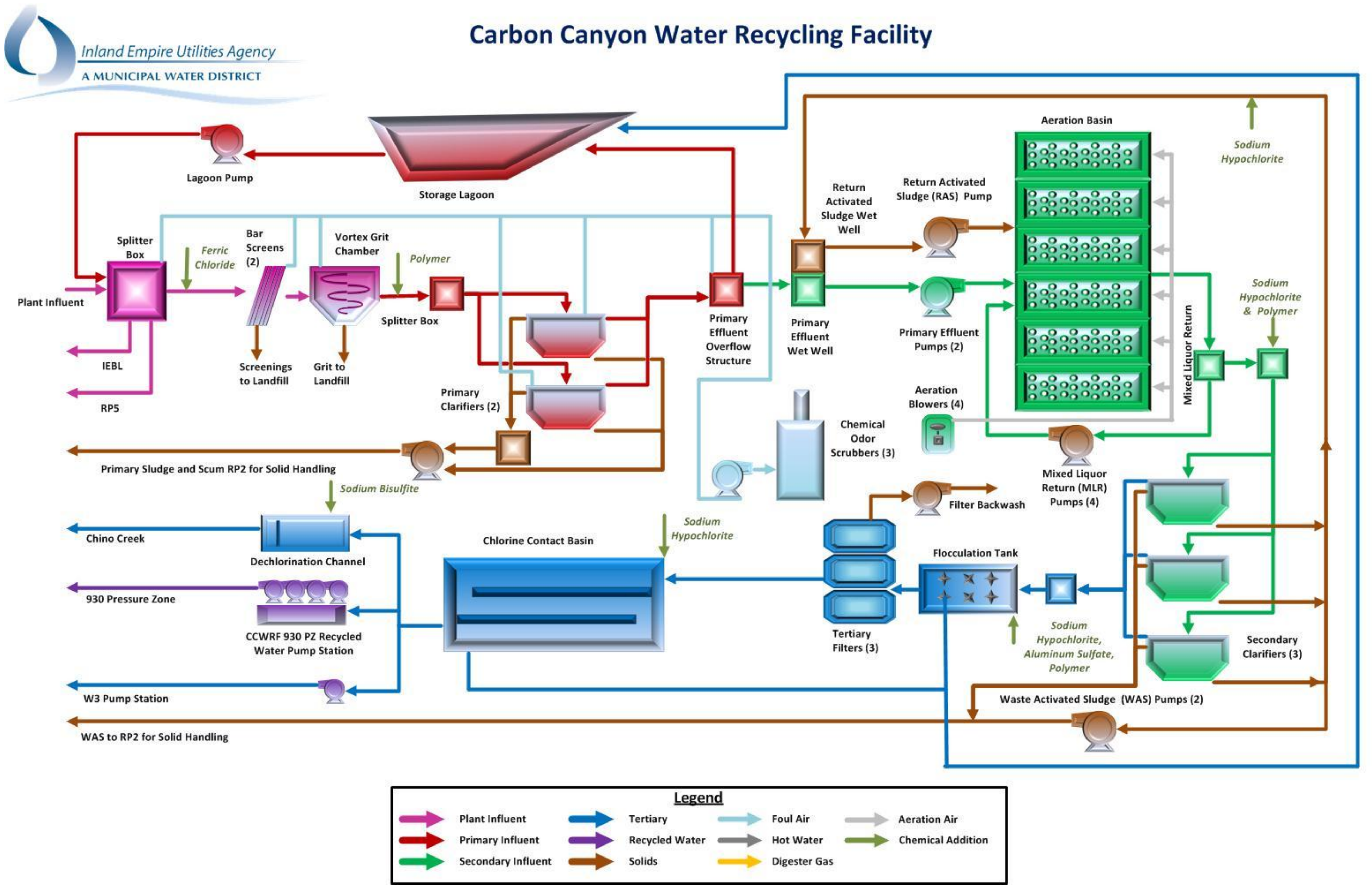

Figure 7-3: Carbon Canyon Water Recycling Facility (CCWRF) – Schematic

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Table 7-4: Carbon Canyon Water Recycling Facility – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN14027	CCWRF Secondary Clarifier #3 Rehabilitation	Rehab steel components and coat concrete of clarifier.	RO	CC	20,000	0	0	0	0	0	0	0	0	0	20,000
2	TBD	CCWRF Lagoon Riprap Reinforcement	When flow is bypassed at flocculation basin or overflown from chlorine contact basin splitter box, the existing riprap does not sufficiently prevent side slope erosion near the discharge pipes. Engineering has a project in the development stage to address this issue.	RC	CC	50,000	0	0	0	0	0	0	0	0	0	50,000
3	TBD	CCWRF Odor Control and Headworks Replacements (AMP)	Odor control equipment and others equipment are at the end of their useful life - project necessitated by AMP	RC	CC	0	600,000	2,500,000	3,900,000	0	0	0	0	0	0	7,000,000
4	TBD	CCWRF Backup Generator Control Upgrade	Automatic Transfer Control for the backup generator is nearing the end of its service life and should be upgraded with new technology	RO	RP	0	0	250,000	0	0	0	0	0	0	0	250,000
5	TBD	CCWRF Aeration Blower Replacement	The existing blower system is nearing the end of its service life. Blowers #1 through #3 are 23 years old and Blower #4 is 20 years old. Blower start is not standardized: #1 and #4 are soft start, #2 and #3 are across the line. #1 blower has high vibration (or high vibration sensor) issue and is not being used. #3 has bad bearing. #1 through #3 does not have outlet diffusers and have limited turn down.	RC	RP	0	0	500,000	1,500,000	500,000	0	0	0	0	0	2,500,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014

(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)

(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

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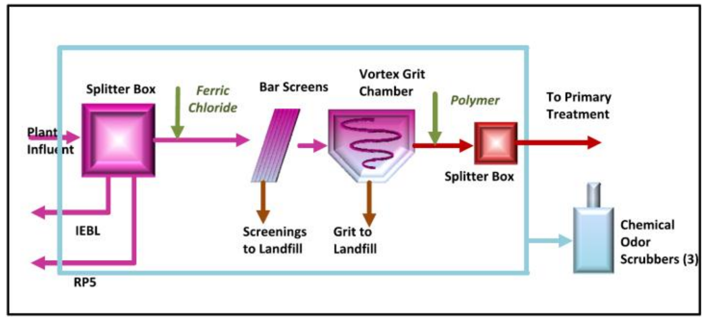
Asset Management System Summary – CCWRF
Preliminary Treatment Process
1. Asset Profile



Influent Channel
Raw wastewater enters Carbon Canyon Water Recycling Facility (CCWRF) through the influent diversion structure. The influent diversion structure enables CCWRF to operate as a skimming plant, taking the majority of raw wastewater and sending the remainder to RP-5. The amount of flow to RP5 is measured at the Parshall flume downstream of the diversion structure, and CCWRF influent is measured at the Parshall flume downstream of the vortex grit chamber.

Screening Equipment
Gates divert flow to three channels: two mechanical bar screens and one manual bar screen. The 5/8-inch bar screens remove rags and large debris that could damage the downstream process equipment or reduce the overall reliability and effectiveness of the treatment process. A manual bar screen provides standby capacity for the mechanical units.

Vortex Grit System
Flow from the bar screens structure is tangentially directed to the 16-foot-diameter circular vortex grit chamber. A paddle mixer pushes flow in a circular path; grit collects at the bottom, where it is pumped to the grit washing/disposal system.

Grit Washing/Disposal System
Grit pumped from the vortex grit chamber is routed to two grit classifiers, where organic matters are removed from the grit. The grit sinks to a submerged inclined screw and moves up the ramp while being washed. The organic rich liquid from the grit classifiers is directed back to the liquid handling stream.

Screening Conveyance/Disposal System
Screening collected by the bar screens is transported by a conveyor and dropped into a hydraulic washer/compactor. The collected rag is washed and organic rich rinsate is routed to liquid treatment. The hydraulic compact or squeezes out the excess water, reducing the moisture content. The compacted rags are pushed out to the roll-off bin for disposal.

Ferric Chloride System
Ferric chloride is added to the raw wastewater flow immediately after the influent diversion structure to enhance the solids capture during primary treatment and to control odors caused by hydrogen sulfides. The ferric station consists of a truck filling station, 7,000-gallon storage tank, two chemical metering pumps, and associated piping.

Polymer System
Polymer can be injected to the liquid flow after grit removal to enhance primary treatment. The polymer system includes a 500-gallon tote stand, chemical metering pump, mixing chamber, and associated piping.

Headworks Splitter Box
The headworks splitter box receives flow from the vortex grit chamber. The flow is normally routed to primary clarifiers; however, it can also be routed to the primary effluent structure, bypassing the primary treatment.

Odor Control Chemical Scrubber
Foul air collected in the preliminary and primary treatment processes are forced through three chemical odor control scrubbers where bleach solution is atomized to chemically remove and oxidize hydrogen sulfide and odor causing gases. The system consists of co-current scrubbing vessel, bleach metering pumps, foul air blowers, air blowers and the associated conveyance pipes.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Preliminary Treatment Process	20.3 MGD	
Influent Channel Sewer Parshall Flume Gates	 54-inch 1 @ 43.9 MGD 2 units	
Screening Equipment Mechanical Screen Manual Screen Gates	 2 @ 20 mgd 1 @ 40 mgd 3 units	 Per Unit
Vortex Grit System Chamber Grit Pump Gates	 1 @ 20.3 mgd 2 @ 220 gpm 15 hp 2 units	 Per Unit
Grit Washing & Disposal System Classifiers	 2 @ 200 gpm	 Per Unit
Screening Conveyance & Disposal System Conveyor Compactor	 1 hp NA	
Ferric Chloride System Tank Pumps	 7,000 gallons 2 @ 92 gph	 Per Unit
Polymer System Pump	 1 @ 4.5 gph	
Headworks Splitter Box Gates	 3 units	
Odor Control Chemical Scrubbers Blower(1A) Blower(1B1,1B2) Valves	 1 @ 6,500 scfm 2 @ 4,400 scfm 3 units	 Per Unit > 18-inch

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Influent Channel	2	2	2	2
Screening Equipment	4	3	4	4
Vortex Grit System	3	3	3	3
Grit Washing & Disposal System	3	3	2	3
Screening Conveyance/Disposal System	3	3	3	4
Ferric Chloride System	4	3	4	3
Polymer System	4	2	3	3
Headworks Splitter Box	3	3	3	3
Odor Control Chemical Scrubber	4	4	4	4

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Influent Channel
CCWRF lagoon pump discharges to upstream of RP5 and CCWRF control gates in the influent diversion structure. The flow may go to RP5, CCWRF or both. There is no flow meter to quantify the amount of flow into the lagoon. Because of this efficiency, the lagoon flow may be double counted as CCWRF influent.

Screening Equipment
The bar spacing allows a large volume of rags to reach downstream processes.

The clearance between the bar screens and the enclosure of the structure is tight, making it difficult for maintenance or housekeeping.

Gate (FGBI-5002, GATE BS-2 Inlet) leading to the west mechanical bar screen has failed in the open position since September 2013.

A potential project will address these issues.

Vortex Grit System
The performance of the vortex grit system is satisfactory. However, it has been 20 years since the original install, and the system is nearing the end of its service life. The downstream processes are vulnerable in the event of a mechanical failure. A condition assessment is needed to identify state of this asset.

Grit Washing/Disposal System
No issues require special attention.

Screening Conveyance/Disposal
The conveyor equipment is corroded and has limited accessibility for cleaning and repair. The screening conveyance system fails regularly (3 to 4 times per year). A potential project will address these issues.

A new rag washer and compaction unit was installed in 2014, reducing the moisture content of screening material

Ferric Chloride System
Ferric chloride system operates effectively, but the storage tank is 20 years old and is approaching the end of its useful life.

Polymer System
No issues require special attention.

Headworks Splitter Box
No issues require special attention.

Odor Control Chemical Scrubbers
The existing concurrent odor control system is in poor condition. The pH, H_2S, pressure transmitters, pumps, and control equipment are broken and inoperable. Sections of bleach conveyance system are clogged with deposits, restricting the flow chemical and requiring additional manpower for upkeep. Bleach and caustic storage tanks are more than 20 years old, and there is evidence of leakages at the flanges. A viable alternative is immediately needed for compliance and reliability.

An in-house maintenance project is in progress to improve short to midterm reliability. The project will install a knock out drum at System A to prevent bleach emission, repair System B and C fiberglass vessels to stop the leak, replace blowers and bleach pumps.

A potential project will address these issues for the long term.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Influent Channel	1993 2006	Planned 14/15
Screening Equipment	1993	Planned 14/15
Vortex Grit System	1993	Planned 14/15
Grit Washing/Disposal System	1993	
Screening Conveyance/Disposal System	1993 2014	
Ferric Chloride System	1993	
Polymer System	1993	
Headworks Splitter Box	1993	Planned 14/15
Odor Control Chemical Scrubber	1993 2011 2012	

Table 4 Potential Projects

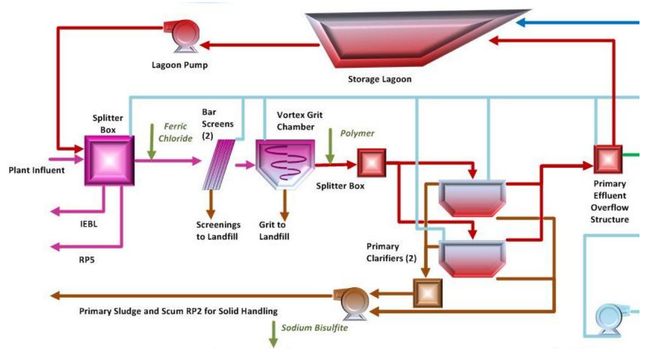
System	Project Name	Project Description
Screening Equipment	CCWRF Odor Control and Headworks Replacement	Replace screening equipment and isolation gates.
Screening Conveyance and Disposal	CCWRF Odor Control and Headworks Replacement	Replace screening conveyance and disposal equipment.
Odor Scrubber	CCWRF Odor Control and Headworks Replacement	Replace Odor Control Scrubber Equipment.

System Summary Continued on Next Page

Asset Management System Summary – CCWRF

Primary Treatment Process

1. Asset Profile



Primary Splitter Box
The splitter box receives flow from the vortex grit chamber. By using a system of gates, the flow is routed to one or two clarifiers or is bypassed to Primary Effluent Overflow Structure. The splitter box has provisions for future expansions and points of connections are established. The splitter box shares a common wall with the primary effluent structure.

Primary Clarifiers
Two 95-foot diameter, center-feed, circular primary clarifiers provide sedimentation. Gear-driven flights direct settled solids to the center, and floatable scum to a system of pumps that discharge to an intermediate wet well for temporary storage. The primary effluent is routed by gravity to the primary effluent splitter box, where it is combined with the effluent from other primary clarifiers, and then flows by gravity to the primary effluent pump station.

Sludge Pumping System
Primary sludge is pumped out of the primary clarifiers continuously to RP2 for solid handling. A system of valves automatically alternates between the two clarifiers on operator selected timer.

Scum Pumping System
Scum collected in the primary clarifiers is directed to an intermediate wet well and is combined with spent bleach from System B and C. Depending on the level, a transfer pump will pull from the wet well and pump to RP2 for solids thickening. The scum collection system and intermediate wet well are covered, and the vapor space is connected to the odor control chemical scrubbers.

Primary Effluent Overflow Structure
Primary treated water is routed to the primary effluent overflow structure by gravity before it reaches the primary effluent pump station. By a system of pipes established at pre-set elevations, the primary treated water is routed to (1) the primary effluent pump station for secondary treatment or (2) the storage lagoon if there is a power failure or mechanical problem or if the system is hydraulically overloaded.

Storage Lagoon System
Storage lagoon features an onsite, short-term storage capacity of primary effluent, secondary effluent, or tertiary effluent. The primary effluent passively overflows into the storage lagoon in the event of primary effluent pump failure or power outage. Secondary effluent can overflow into the storage lagoon if the filter influent gate closes. In addition, if a noncompliant condition is reached at the tertiary section, tertiary effluent can be overflown into the storage lagoon. The floor of the lagoon is covered with concrete, and the side slope has vegetation to counter the effect of erosion. Stored water is pumped back into the influent diversion structure on an operator selected time and is retreated in the liquid treatment process.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Primary Treatment Process	13.2 MGD	
Primary Splitter Box Gates	 3 units	
Primary Clarifiers Drives Gates	2 @ 1,760 gpd/ft^2 7,088 ft^2 1 @ 0.5 hp 4 units	Per Unit Per Unit
Sludge Pumping System Pumps	 2 @ 220 gpm 30 hp	 Per Unit
Scum Pumping System Pump	 2 @ 220 gpm 10.5 hp	 Per Unit
Intermediate Wet Well Gates	 N/A units	
Storage Lagoon System Gates Pump	1 @ 9.0 MG N/A units 1 @ 1,500 gpm 30 hp	
Primary Effluent Overflow Structure Gates	 N/A Units	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Primary Splitter Box	3	3	3	3
Primary Clarifier	4	3	3	3
Sludge Pumping System	3	3	3	3
Scum Pumping System	3	3	3	3
Intermediate Wet Well	3	3	3	2
Storage Lagoon System	4	3	4	4
Primary Effluent Overflow Structure	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Primary Splitter Box
Three gates are utilized to either route flow to or bypass primary clarifiers. Two gates that route flow to primary clarifier are normally opened but are typically not exercised. Conversely, the bypass gate is normally closed and is not typically exercised. The functionality of these gates is largely unknown. Gates operating in similar environment in the sister plants showed severe corrosion. The primary splitter box and three gates should be taken down and inspected.

Primary Clarifiers
Concrete sidewalks surrounding the primary clarifiers are detached from the sidewall and have settled more than five inches. In recent years, there have been numerous pipe line breakages: an 8-inch primary sludge line break and utility water line breakages (2012) was near this area. The breakages may be related to the settlement of the soil. A potential project is needed to address this issue.

Sludge Pumping System
No issues require special attention.

Scum Pump System
The scum wet well has limited controls and instrumentation. The floatables form a raft in the wet well, and the scum pump suction pulls from the bottom of the scum box. The floatables must be cleaned regularly.

Intermediate Wet Well
No issues require special attention.

Storage Lagoon System
It is unknown whether the storage lagoon system is intended as a containment system. A survey of historical record does not reveal whether compacted clay liner or geomembrane was used. The bottom of the storage lagoon is concrete, and the side slope is soil with shallow rooted vegetation.

When flow is bypassed at flocculation basin or overflown from chlorine contact basin splitter box, the existing riprap does not sufficiently prevent the side slope erosion at the discharge pipes. A potential project will address this issue.

Primary Effluent Overflow Structure
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Primary Splitter Box	1993	Planned 14/15
Primary Clarifiers	1993 2006	1: Complete 2014 2: Complete 2014
Sludge Pumping System	1993	
Scum Pumping System	1993 2006	
Intermediate Wet Well	1993	
Storage Lagoon System	1993	
Primary Effluent Overflow Structure	1993	Planned 15/16

Table 4 Potential Projects

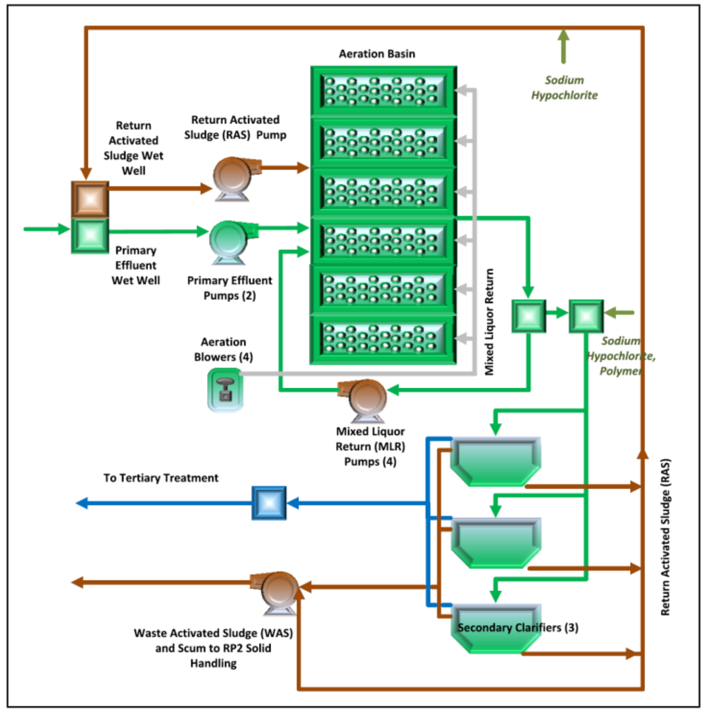
System	Project Name	Project Description
Primary Clarifiers	Primary Clarifier Sidewalk Repair	Evaluate the uneven settling of the concrete around the primary clarifiers. Replace concrete and ancillary piping as needed to address the system issues.
Storage Lagoon	CCWRF Lagoon Riprap Reinforcement	Reinforce existing riprap

System Summary Continued on Next Page

Asset Management System Summary – CCWRF

Secondary Treatment Process

1. Asset Profile



Primary Effluent Pump System
Primary effluent flows by gravity into the primary effluent pump station wet well. The wet well can be interconnected with return activated sludge (RAS) wet well and serve as a common wet well by opening a gate. The normal mode of operation is to operate the primary effluent wet well and RAS wet well independently. One of two vertical-turbine pumps lifts water to the aeration basin.

Activated Sludge System
There are two distribution channels for the aeration basins. By manipulating a system of gates, various combinations of primary effluent, RAS, and MLR can be introduced to the aeration basin. Normal mode of operation is to combine primary effluent, RAS, and MLR flows as one stream and distribute the stream equally to six different aeration basins. Propeller mixers are located at the distribution channel and aeration basin to promote mixing and prevent stratification of the mixed liquor.

The trains, with the exception of Train1, have baffled partitions. Each train operates in modified Ludzak-Ettinger configuration with an anoxic zone followed by three oxic zones to achieve the nitrate removal. A system of aeration sheaths, aeration control valves, and dissolved oxygen probes is used to limit or increase the volume of air introduction. The effluent from each aeration basin is combined in a common channel, a percentage of this mixed liquor is rerouted to the front of the aeration basin and the balance is routed to the secondary clarifiers.

Secondary Clarifiers
Mixed liquor from the aeration trains flows into the mixed liquor return pump station, and any unpumped mixed liquor passively flows into the secondary influent diversion structure. From the diversion structure, the flow is distributed evenly to three 120-feet-diameter, center-feed, circular secondary clarifiers. Each clarifier has a rotating sludge and skimmer arm. Solids settle to the bottom and are recycled to the aeration basin. The overflow of the secondary clarification is combined in the secondary effluent splitter box and is routed to the flocculation basin for further treatment.

Return Activated Sludge (RAS) Pumping System
The settled sludge in the secondary clarifiers is combined in the common header and routed by gravity into the RAS wet well located upstream of the aeration basin. The desired RAS flow rate at each clarifier is controlled by modulating a 16-inch flow-control valve on the RAS line. From the RAS wet well, RAS is pumped to the aeration basin distribution channel, and is mixed with primary effluent and mixed liquor return.

Waste Activated Sludge (WAS) Pumping System
To control the microorganism concentrations in the aeration system, a portion of the settled solids from the secondary clarifiers is wasted. The known volume of WAS is pumped out of the secondary system to RP2 for solid handling.

Scum Pumping System
Scum collected from the skimmer arm of the secondary clarifiers is routed to RP2 for solid handling in a common line along with WAS.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Secondary Treatment Process	12.0 MGD	
Primary Effluent Pump System	2 @ 17.6 MGD 125 hp	
Activated Sludge System Blowers Trains Depth Mixers Gates Valve Valves (air) MLR Pumps	 6 @ 2.02 MGD 3 @ 6000 scfm 400 hp 10.3 psig 1 @ 6400 scfm 400 hp 12.1 psig 6 @ 1.49 MG 21 ft 22_ @ 12 hp 5 per train 4 per system 1 (FCV), 3 (manual) per unit 4 @ 7,425 gpm 50 hp	 Per Unit Per Unit > 12-inch > 12-inch
Secondary Clarifiers Gates	3 @ 360 gpd/ft^2 120 ft^2 6 units	
RAS Pumping System Valves Gates	1 @ 17.6 MGD 125 hp 2 units 13 units	 > 18-inch
WAS Pumping System	2 @ 350 gpm 7.5 hp	
Scum Pumping System	3 @ 450 gpm 5 hp	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Primary Effluent Pump System	3	2	3	2
Activated Sludge System	4	4	4	4
Secondary Clarifiers	3	3	3	3
RAS Pumping System	4	3	3	4
WAS Pumping System	3	2	2	3
Scum Pumping System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Primary Effluent Pump System
The primary effluent and RAS pump are reconditioned at a scheduled interval and provide adequate pumping capacity and reliability. One of the two primary effluent pumps and the RAS pump were reconditioned in 2013. The concrete structure (primary effluent distribution channel) is showing some evidences of leakage on top, near the output side of the primary effluent pumps.

Activated Sludge System
An evidence of concrete deterioration exists on the distribution channel leading into Basin #1. The mixed liquor influent gate to Basin #1 is reinforced externally to the concrete structure. The extent of the deterioration is appears to be superficial. However, this area shall be inspected thoroughly during the upcoming condition assessment in 2015.

The aeration flexible sheaths need to be replaced at regular (every five year) intervals because of solid build up or tears in the flexible sheath that reduce oxygen transfer efficiency . An in-house project is in progress to address this issue.

Blower #1 has high vibration issue and does not reliably run. Blower #3 has bad bearings on the blower and does not run. In addition, all four blowers at CCWRF are more than 22 years old and nearing the end of their service life. In addition, Blower #1, #2 and #3 do not have sufficient turn-down ratio. During the low flow condition, the activated sludge system is over-aerated, resulting in excessively high dissolved oxygen concentration. The over-aeration results in waste of energy and operational challenges. A potential project will address these issues

Many of the gates in the RAS channel that route flows to the aeration basins are severely corroded and do not travel up and down. This area shall be inspected thoroughly during the upcoming condition assessment in 2015

An 18 inch Solids Processing Recycle Pump and its associated piping is abandoned in place at Basin #1 and #2. The equipment shall be removed by the Maintenance.

Mixed Liquor Return Pump #3 is out of service due to defective bushing. The pump shall be refurbished by the Maintenance Department.

Secondary Clarifiers
There is a significant geotechnical settlement near secondary clarifiers that may be affecting the structural integrity of the buried pipes and electrical conduits. Secondary Clarifiers 1 and 2 have been rehabilitated, and Secondary Clarifier 3 is scheduled to be rehabilitated under Project EN14027.

RAS Pumping System
The RAS flow meters and RAS flow control valves are more than 20 years old and are nearing the end of their useful service life. The ability to flow desired volume of RAS is important for process control. A maintenance project is needed to replace this equipment.

WAS Pumping System
No issues require special attention.

Table 3 History of Select Assets

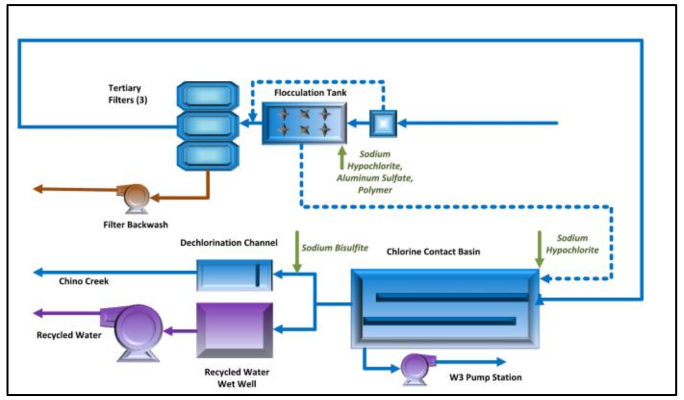
System	Capital Improvement Project Activity	Condition Assessment Report
Primary Effluent Pump System	1993 1998 2013	Planned 15/16
Activated Sludge System	1993	Planned 15/16
Secondary Clarifiers	1993 2012 2013	
RAS Pumping System	1993 2013	
WAS Pumping System	1993	Planned 15/16
Scum Pumping System	1993 2012 2013	

Table 4 Potential Projects

System	Project Name	Project Description
Activated Sludge System	CCWRF Aeration Blower Replacement	Evaluate and replace the aeration blower and controls.
RAS Pumping System	RAS Pumping System Upgrades	Replace RAS flowmeter and control valves.

System Summary Continued on Next Page

Asset Management System Summary – CCWRF
Tertiary Treatment Process
1. Asset Profile



Aluminum Sulfate (Alum) System
Secondary effluents from three secondary clarifiers are combined and travel to the rapid mix system, where aluminum sulfate, sodium hypochlorite, or polymer are introduced. The chemicals neutralize and destabilize the colloidal particles and enhance the solid/liquid separation. After the chemical addition and rapid mix, the water travels through a hydraulic flocculation basin in a baffled serpentine and ends up at three sand filters that are running in parallel.

Filters
The water passes through three automatic backwashing sand filters. The backwashes are initiated by either timer or the head loss across the sand filter. Backwash water is sent to the filter backwash pump station and pumped back into the aeration basin for treatment. The effluent from the filters flows by gravity to the chlorine contact basin for disinfection.

Filter Backwash Pump Station
The scum, backwash water, and drainage from the filter are collected by gravity in the filter backwash pump station. Upon reaching the pre-set level, the filter backwash water is pumped back into the aeration basin for treatment.

Chlorination System
Two 10,000-gallon bleach tanks housed indoor receive and hold 12.5 percent sodium hypochlorite (bleach) solution. Two chemical metering pumps inject bleach into the water champ located at the chlorine contact basin and provide disinfection. Two other pumps inject bleach into either filter influent or RAS for process control.

Chlorine Contact Basins
The chlorine contact basin is a dual-cell concrete structure that uses a serpentine flow path to achieve required contact time and disinfection of treated water. The bleach is introduced at the beginning of the serpentine, and free chlorine remains in the water while undergoing a plug flow. The influent flow rate is measured by a Parshall flume, and chlorine residual is measured at three different locations: influent, mid, and final.

Dechlorination System
The final 5137 cubic feet of last pass of the chlorine contact basin is used as a dechlorination structure, where sodium bisulfite solution (SBS) is introduced. The excess effluent that is not used in the recycled water system is discharged into Chino Creek. Before the discharge, chlorine residual present in the flow is neutralized with SBS by a chemical reaction. Two units of propeller mixers and under-flow baffle promote the mixing. SBS is stored in two 5,500-gallon chemical tanks and is metered into the system via five chemical metering pumps.

2. Capacity Profile
Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Tertiary Treatment Process	15.4 MGD	
Alum System Tank Pump Mechanical Mixer	 1 @ 5000 gallons 2 @ 3.7 gph 1 @ 15 hp	
Filters Travelling bridge Backwash pump Skimmer pump Filter Loading Gates Valves	3 @ 1,600 ft^2 3 @ 0.5 hp 3 @ 400 gpm 7.5 hp 6 @ 40 gpm 0.5 hp 4 gpm/ft^2 7 units 6 units	Per Unit Per Unit Per Unit Per Unit > 18-inch
Filter Backwash Pump Station	3 @ 950 gpm 14.8 hp	Per Unit
Chlorination System Tanks Pumps Mixers	 2 @ 10,000 gallons 4 @ 77 gph 1 water champ 2 propeller mixers	 Per Unit Per Unit
Chlorine Contact Basins Gates Valves	1 @ 1.0 MG 11 units N/A units	 > 18-inch
Effluent Splitter Box Gates	 2 units	
Dechlorination System Tanks Pumps Gates	 2 @ 5500 gallon 2 @ 2.5 gph; 2 @ 20 gph; 1 @ 77 gph 2 units	 Per Unit Per Unit

3. Asset Ratings
Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Alum System	4	3	3	3
Filters	3	3	3	3
Filter Backwash System	3	3	3	3
Chlorination System	2	2	2	2
Chlorine Contact Basins	3	4	3	3
Effluent Splitter Box	1	3	3	3
Dechlorination System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation
Alum System
No issues require special attention, but the equipment is 20 years old and is approaching the end of its useful life.

Filters
The performance of three shallow bed filters is adequate. CCWRF tertiary filter media was replaced and rehabilitated in 2012. However, most of the ancillary equipment, such as the influent gates, weir plates, and drain valves, has never been serviced since the original installation in 1993. As the service life of the ancillary equipment is nearing the end of its useful life, a provision to, at minimum, inspect the condition should be made. A condition assessment shall be performed to access the state of the assets.

Filter Backwash System
No issues require special attention, but the equipment is 20 years old and is approaching the end of its useful life.

Chlorination System
The chlorination system for the chlorine contact basin disinfection is adequate.

Chlorine Contact Basins
No issues require special attention.

Effluent Splitter Box
The overflow pipe elevation is higher than the elevation of the effluent gate. During the gate closure event, the water surface level does not reach the overflow pipe as desired. The existing outlet, 90 degree flared elbow, was removed and new overflow box is at elevation 599.25'

Dechlorination System
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Alum System	1993	Planned 15/16
Filters	1993 2012	Planned 15/16
Filter Backwash System	1993	Planned 15/16
Chlorination System	1993 2004	
Chlorine Contact Basin	1993	
Effluent Splitter Box	2014	
Dechlorination System	1993 2004 2013	

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – CCWRF
Auxiliary Systems
1. Asset Profile

Plant Drain
The plant drain collects surface storm runoff, excess irrigation, and wash-down water collected in submersible drains located throughout the facility. The drain system receives gravity flows to a wet well, where it is then pumped and recycled toward the secondary clarifier influent, aeration basin, or head of the treatment process.

Electrical System
The electrical energy to power the treatment facility is obtained from the local electrical grid (SCE) and from onsite energy generation (solar and emergency generators). The solar assets are owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the maintenance building, where transformers and switchgear are located to distribute electrical energy throughout the facility. A single line diagram of the CCWRF electrical system is shown in Appendix B.

Diesel emergency generators are used in the event of a power failure. A 1500 kW generator is located in the maintenance building and supplies power to the preliminary, primary, secondary, and tertiary sections.

An extensive lighting system is needed to illuminate the facility during dark hours. Most lighting fixtures are equipped with light sensors to turn off when sufficient lighting is provided from the sun. Lighting units are inside each of the process buildings, on equipment walls, and along the roadways for safety.

Utility Water (UW) System
Utility water is used throughout the facility to clean, supply pump seal water, cool, dilute, flush clogged pipes, irrigate, and more. The system is supplied by either 930-foot pressure zone or the W3 pump station. The piping consists of several isolation valves and point-of-use connections.

Potable Water System
Potable water is used throughout the plant for restrooms, cooling, odor scrubber dilution water, fire suppression, and more. The system is supplied from a service on Telephone Avenue from the City of Chino. The system has several backflow devices to protect the drinking water system.

Instrumentation and Control System
An extensive array of instruments is used to monitor and control the processes at CCWRF. Nearly all the processes at the plant are observed and controlled from a centralized SCADA system. Control wiring and local panels are provided at individual pieces of equipment, and control wiring transmits data to two main control terminals at the main control building and the chlorine building.

Yard Piping
A substantial network of pipes is used to convey flows between unit processes. The material, sizes, and service conditions of these pipes vary widely. A yard piping diagram is show in Appendix C.

2. Capacity Profile
Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Plant Drain	10 @ 150 gpm 3 hp	
Electrical System Utility Voltage Transformers Switchgear Distribution Generator Mounted Lighting	 12 kV 12 kV to 480 V 12 kV to 4,160 V 12 kV 480 V 1 @ 1500 kW 2010 Bhp >26 units	
Utility Water System Pipelines W3 Pump Station Valves	 Various sizes 2 @ 780 gpm 40 hp 2 @ 270 gpm 20 hp 20 units	
Potable Water System Backflow Devices	 6 units	
Instrumentation and Control System HMI Workstation RTU PLC I/O Hub Radio Transmitter		
Yard Piping	See Appendix C	

3. Asset Ratings
Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Plant Drain	3	3	3	3
Electrical System	4	3	4	4
Utility Water System	3	4	4	3
Potable Water System	3	3	3	3
Instrumentation and Control System	4	3	4	3
Yard Piping	4	3	4	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation
Plant Drain
No issues require special attention.

Electrical System
During 2012 wet seasons, a few components in the headworks electrical system were vulnerable to moisture. Automatic transfer control for the backup generator is nearing the end of its service life and should be upgraded with new technology. A potential project will address these issues.

Utility Water (UW) System
The pumping capacity and the efficiency of the W3 pumps have greatly decreased over time. The pumps are designed to pump 2,100 gpm total, but they pump only half of their combined designed capacity.

Potable Water System
No issues require special attention.

Instrumentation and Control System
CCWRF is first plant that will benefit from the SCADA migration project, EN13016.

Yard Piping
Many of the UW isolation valves do not hold, making it difficult to isolate flow during the shutdown events.

CCWRF mixed liquor line from MLR pump station to secondary clarifiers is showing evidences of leak. Inspect and repair the line.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Plant Drain	1993	
Electrical System	1993	
Utility Water System	1993	
Potable Water System	1993	
Instrumentation and Control System	1993	
Yard Piping	1993	

Table 4 Potential Projects

System	Project Name	Project Description
Electrical System	CCWRF Backup Generator Control Upgrade	Automatic Transfer Control for the backup generator is nearing the end of its service life and should be upgraded with new technology
Yard Piping	Mixed Liquor Return Line Inspection	CCWRF mixed liquor line from MLR pump station to secondary clarifiers is showing evidences of leak. Inspect and repair the line

End of System Summary

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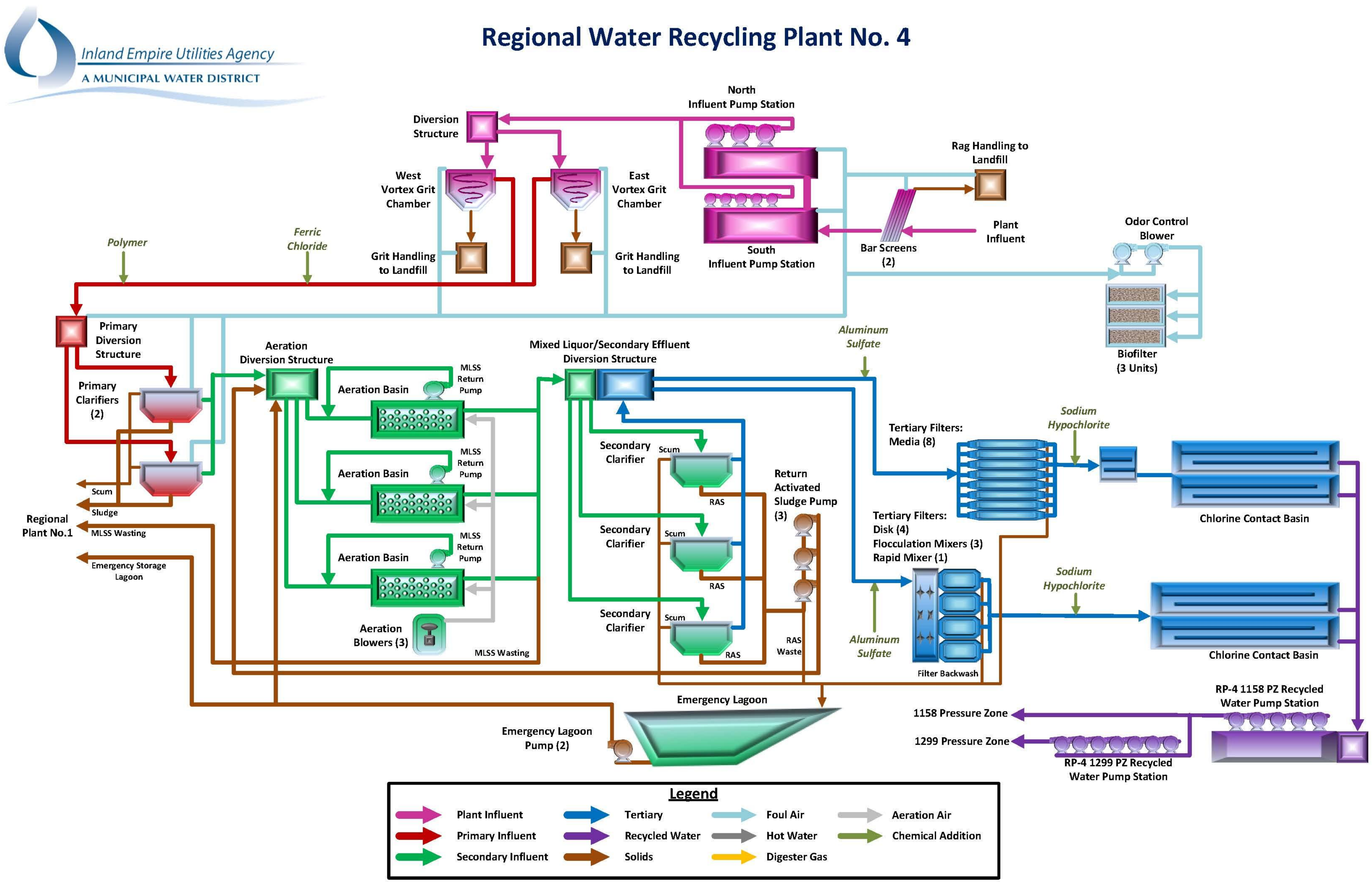

Figure 7-4: Regional Water Recycling Plant No. 4 (RP-4) – Schematic

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Table 7-5: Regional Water Recycling Plant No.4 – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN09021	RP-4 Headworks Retrofit	This project will include replacing both of the bar rack screens with fine screens, modifying the screening enclosure, repaving damaged concrete within the screening enclosure and replacing gates isolating the headworks screens.	RO	CC	25,000	0	0	0	0	0	0	0	0	0	25,000
2	EN14018	RP-4 Chlorination Facility Retrofit	The project will replace the existing chlorination facility and associated equipment. Possible pipe gallery as an option.	RO	CC	550,000	1,500,000	0	0	0	0	0	0	0	0	2,050,000
3	TBD	RP-4 Process Improvements	The project will include various process improvements (grit removal system, primary diversion structure, aeration blower replacement, RAS wasting station, MLSS wasting station, filtration system, secondary clarifier drain valves, lagoon recovery pump station, secondary clarifier weir washers, and recycled water distribution system).	RO	CC	0	200,000	3,000,000	2,000,000	0	0	0	0	0	0	5,200,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014

(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)

(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

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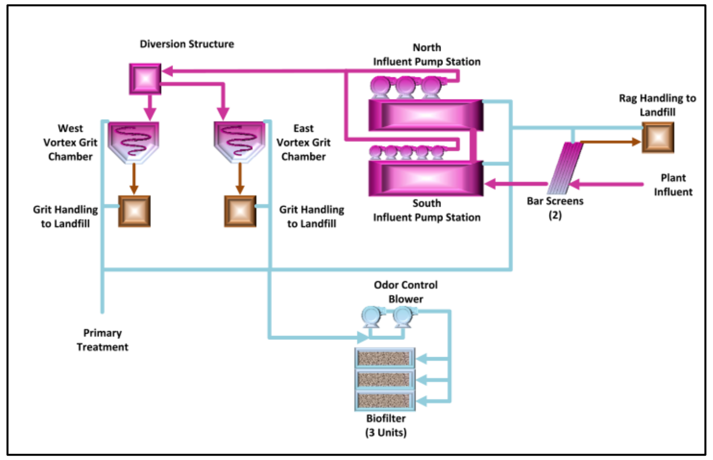
Asset Management System Summary – RP-4
Preliminary Treatment Process

1. Asset Profile



Influent Channel
Raw wastewater enters the plant through a 42-inch gravity sewer pipeline. A composite sample and other instrumentation are used to monitor the plant's influent flow, which establishes the official influent monitoring control point for the treatment plant.

Screening Equipment
Influent flow is diverted into two channels. Both channels are equipped with a mechanical rake and rigid bar screen. These units remove all solids before the solids enter the treatment plant. Screened solids are conveyed to a waste storage bin to await landfill disposal.

Influent Pump Station
The screened wastewater enters the south influent wet well and then flows into the north wet well. The southern influent pump station is equipped with five dry-mount pumps, and the north influent pump station is equipped with three submersible pumps. Both influent pump stations lift screened wastewater into a common pipeline, which enters the headworks flow diversion structure.

Influent Flow Metering
The lifted flow enters the common pipeline, equipped with a magnetic flow meter that records the daily flow through the plant. The common pipeline has a flow meter bypass for flow meter maintenance. Metered flow enters two diversion structures where gates regulate flow through the grit removal system.

Vortex Grit System
The metered flow is diverted into two separate grit-removal systems. Each grit-removal system is equipped with a vortex grit chamber and classifier. Grit and other inorganic material are removed before entering the primary treatment process. The material is conveyed to a waste storage bin to await landfill disposal.

Grit Washing/Disposal System
Grit pumped from the vortex grit chamber is routed to two grit classifiers, where organic matters are removed from the grit. The grit sinks to a submerged inclined screw and moves up the ramp while being washed. The organic rich liquid from the grit classifiers are directed back to the liquid handling stream.

Screening Conveyance/Disposal System
Screening collected by the bar screens is transported by a conveyor and dropped into a waste bin.

Odor Control System
The foul air is extracted from the influent screening enclosure, influent pump stations, the grit-removal vortex chambers, the grit-waste storage bins, and the primary clarifiers and conveyed to the media biofilters to remove odorous compounds. The odor control system is equipped with two blowers and three biofilters.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Preliminary Treatment Process	16.1 MGD	
Influent Channel Sewer	42-inch	
Screening Equipment Mechanical Screen Gates	2 @ 36.2 mgd 3 hp 4 units	Peak Per Unit
Influent Pump Station Pumps Valves	3 @ 6,000 gpm 100 hp 5 @ 3,275 gpm 50hp 8 units	Per Unit Per Unit > 12-inch
Influent Flow Meter Valves	1 @ 48.3 mgd 3 units	
Vortex Grit System Paddle Drive Pump Gates	2 @ 16.1 mgd 2 @ 1.5 hp 3 @ 250 gpm 10 hp 8 units	Per Unit Per Unit Per Unit
Grit Washing & Disposal System Classifier	2 @ 50 gpm 5 hp	
Screening Conveyance & Disposal System Conveyor	1 hp	
Odor Control System Foul Air Fan Biofilter Pump Valves	2 @ 12,500 scfm 30.8 hp 3 @ 5,011 ft^3 2 @ 214 gpm 3 hp 10 units	Per Unit Per Unit Per Unit > 18-inch

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Influent Channel	4	3	4	3
Screening Equipment	4	4	4	4
Influent Pump Station	3	3	3	3
Influent Flow Meter	3	3	3	3
Vortex Grit System	4	3	4	4
Grit Washing/Disposal System	3	3	4	3
Screening Conveyance/Disposal	4	4	4	4
Odor Control System	3	3	3	3

* These ratings are defined in Appendix A

4. Key Issues for Further Investigation

Influent Channel
The isolation gate between screening channels traps solids when the east bar screen is offline and the west bar screen is online. Project EN09021, to be completed FY2014/15, will modify the influent channel to reduce solids buildup. In addition, isolation gates are being replaced on the influent channel and screens.

Screening Equipment
The bar screens have reached the end of their useful life and can no longer be repaired, so an immediate replacement is required. Project EN09021, to be completed FY2014/15, will replace both bar screens with fine screens, which also improves the capture efficiency.

Influent Pump Station
Wet wells have not been cleaned or inspected since construction. Project EN09021 will dewater and clean the structure.

Influent Flow Meter
No issues require special attention.

Vortex Grit System
The suction piping to grit pumps in grit chamber no.1 clogs. Maintenance has setup flushing connections to expedite cleaning in the case of suction pump blockage. Pumps cannot be remotely operated. The east grit chamber isolation gates need to be replaced because they cannot be used by operations. A potential project will rehab this system.

Grit Washing/Disposal System
The screenings and grit are handled separately. Project EN09021, to be completed FY2014/15, will provide flexibility to add screenings and grit to a common dewatering bin.

Screening Conveyance/Disposal System
The screenings are not dewatered before final waste hauling disposal. The screenings and grit are handled separately. Project EN09021, to be completed FY2014/15, will provide flexibility to add screenings and grit to a common dewatering bin. In addition, cleaning and compacting equipment will be installed for the screenings.

Odor Control System
No issues require special attention, but routine media replacement is required to maintain facility air-quality compliance.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Influent Channel	1997	
Screening Equipment	1997 2002	Planned 14/15
Influent Pump Station	1997 2009	Planned 14/15 (Waiting on Report)
Influent Flow Meter	2009	
Vortex Grit System	1997 2009	Planned 14/15
Grit Washing/Disposal System	1997 2009	
Screening Conveyance & Disposal System	1997 2009	
Odor Control System	2009 2012	

Table 4 Potential Projects

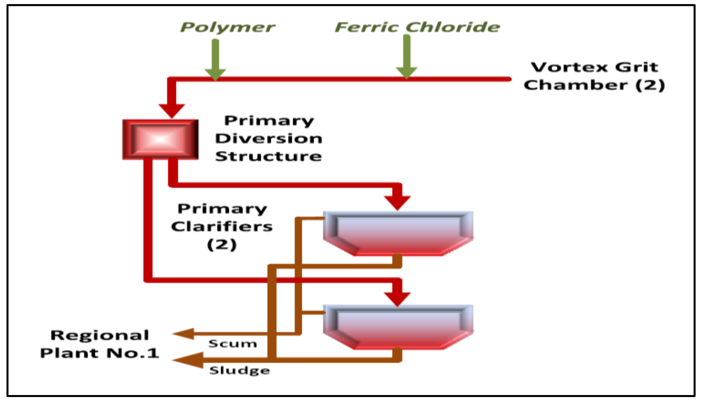
System	Project Name	Project Description
Grit Removal System	RP-4 Process Improvements Phase II	Replace the grit chamber isolation gates and retrofit the grit removal pumping system of grit chamber no.1.

System Summary Continued on Next Page

Asset Management System Summary – RP-4

Primary Treatment Process

1. Asset Profile



Primary Diversion Structure
The preliminary treated flow enters a common 54-inch pipeline and is conveyed to the primary diversion structure. The flow is equally distributed into two 36-inch pipelines, each feeding a circular primary clarifier.

Ferric Chloride System
Ferric chloride is dosed into the raw wastewater before screening. The chemical is used to remove phosphorous and to improve the settling/removal characteristics within the primary clarifiers.

Polymer System
Polymer can be added to the treated flow to improve the settling/removal characteristics within the primary clarifiers, but typically polymer is not used at the plant. Polymer can be injected at the primary diversion structure.

Primary Clarifiers
The facility is equipped with two covered primary clarifiers. The treatment process removes settable solids and floatable scum and grease. There is no solids-handling at RP-4; therefore, all the settled and floatable solids are introduced back into the trunk sewer downstream of RP-4, where they can be processed at RP-1. Solids are wasted out of the clarifier by gravity through actuated valves. Each clarifier is equipped with a flow meter to monitor all solids wasted from the primary treatment process. Primary effluent is conveyed through a 54-inch pipeline.

Sludge/Scum Wasting System
The solids which settle and thicken into sludge are gently mixed by the rotating rake arms on the bottom of the primary clarifiers; this process releases gas bubbles and allows the sludge to compact. A pipe conveys sludge by gravity into the trunk sewer to RP-1; all wasted sludge is recorded by flow meter and automatic control valves. The solids that float and thicken into scum are skimmed into scum beach and stored in a small wet well. A pipe conveys scum by gravity into the trunk sewer to RP-1.

2. Asset Profile

Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Primary Treatment Process	14 MGD	
Primary Diversion Structure Mixer Gates	 1 @ 4 hp 3 units	
Ferric Chloride System Pump Chemical Tank	 2 @ 53.1 gph 8,000 gallons	 Per Unit
Polymer System Metering Pump	 2 @ 4.5 gph	 Per Unit
Primary Clarifier Drive	2 @ 1,617 gpd/ft^2 8,660 ft^2 0.33 hp	Per Unit
Sludge/Scum Wasting System Scum Valves Sludge Valves	 2 units 8 units	 6-inch > 6-inch

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Primary Diversion Structure	4	3	3	3
Ferric Chloride System	4	3	3	3
Polymer System	4	4	4	4
Primary Clarifiers	3	3	3	3
Sludge/Scum Wasting System	3	3	4	4

* These ratings are defined in Appendix A

4. Key Issues for Further Investigation

Primary Diversion Structure
The top of the diversion structure is showing signs of concrete corrosion. Therefore, a condition assessment is planned for 2015. A potential project may be needed to rehab the concrete, install larger inspection hatches for cleaning, and replace influent gates.

Ferric Chloride System
The ferric containment area needs to be recoated. The ferric chloride is being dosed through the original polymer injection pipeline because the original dosing point is upstream of the screening equipment; ferric should be dosed downstream of the grit removal system. A potential project is needed to rehab this system.

Polymer System
The chemical dosing pipeline is being used to inject ferric chloride, and the system is out of service. Polymer dosing to the secondary system would be beneficial for system upsets or increased future plant flows. The system has been offline for over five years and the status of the chemical metering pumps and ancillary equipment is unknown. A potential project is required to rehab this system.

Primary Clarifiers
No issues require special attention. The primaries have never been inspected since the original construction of both structures.

Primary Sludge/Scum Wasting System
Scum-well effluent piping tends to get clogged, a problem which requires flushing the piping or removing the material with a vacuum truck. This system should be evaluated to determine the feasibility for installing a pumping system in place of the current gravity wasting system.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Primary Diversion Structure	2009	Complete 2014 (Waiting on Report)
Ferric Chloride System	2009	
Polymer System	2009	
Primary Clarifiers	2009	1: Complete 2014 (Waiting on Report) 2: Complete 2015 (Waiting on Report)
Sludge/Scum Wasting System	2009	

Table 4 Potential Projects

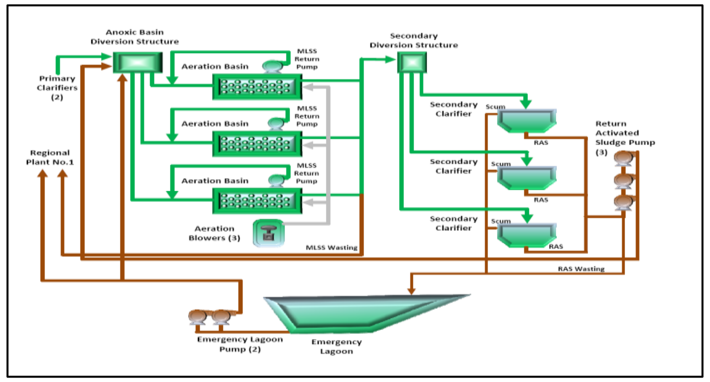
System	Project Name	Project Description
Primary Diversion Structure	RP-4 Process Improvements Phase II	Repair concrete and coat the diversion structure, install larger inspection hatches, and replace primary influent gates.
Ferric Chloride System	RP-4 Process Improvements Phase II	Rehab the ferric chloride system by recoating the ferric containment area and replacing the chemical metering pumps.
Polymer System	RP-4 Process Improvements Phase II	Rehab the existing polymer dosing system by constructing a chemical dosing pipeline to the primary diversion structure and replacing the chemical metering pumps.

System Summary Continued on Next Page

Asset Management System Summary – RP-4

Secondary Treatment Process

1. Asset Profile



Anoxic Basin Diversion Structure
Primary effluent enters the anoxic basin diversion structure and is mixed with return activated sludge, creating mixed liquor. Mixed liquor is diverted equally through three 42-inch pipelines, each feeding an activated sludge system.

Anoxic Basin
One anoxic basin is designated for each of the three activated sludge treatment systems. Each system is composed of an anoxic basin and an aeration basin. The basin is equipped with three mixers to keep solids in suspension throughout the basin. The anoxic basin effluent is diverted through launders into two 30-inch pipelines, which equally feed both aeration basin trains.

Activated Sludge System
An aeration basin is designated for each of the three activated sludge treatment systems. The basins are divided into two trains, and each train is further subdivided into four zones: an extended anoxic zone, oxic zone, another anoxic zone, and another oxic zone. Each zone provides the correct biological environment to consume carbonaceous waste, breakdown ammonia, and reduce pathogens in the mixed liquor. The anoxic zones are equipped with mixers to ensure the solids remain in suspension throughout the treatment process. The oxic zones are equipped with fine-bubble-air diffusers. The diffused air supports the biological process and also provides mixing within the zone. A submersible mixed-liquor return pump is strategically placed at the end of the first oxic zone to recycle flow to the anoxic basin for more efficient treatment. The treatment system is equipped with three blowers to provide pressurized air to the oxic zones. Typically only one or two blowers are needed during the day for the treatment process.

Mixed Liquor Diversion Structure
The mixed liquor enters a common 66-inch pipeline, which feeds the bottom of the mixed liquor diversion structure. The flow is then split equally through three launders, and each launder feeds a secondary clarifier through a 48-inch pipeline.

Secondary Clarifiers
The facility is equipped with three secondary clarifiers. The secondary treatment process provides an environment for the gravity separation of solids from the mixed liquor. The clarified secondary effluent exits the clarifier through a 48-inch pipeline. Scum accumulated on the surface of each of the secondary clarifiers is wasted to the emergency lagoon.
The settled solids are referred to as activated sludge. The activated sludge is recycled to the anoxic basin diversion structure through the return activated sludge pump station. The pump station is equipped with three pumps and has a common 24-inch suction pipeline from each secondary clarifier. To control the population of biological species, activated sludge can be wasted from the common effluent pipeline from the aeration basin; wasted activated sludge is diverted to RP-1 for further treatment.

Return Activated Sludge (RAS) Pumping System
The RAS pumping system is designed to return the settled biomass in the secondary clarifier to the head of the activated sludge system. The system is designed to pump at a rate of 30 to 100 percent of the full average daily flow of the facility.

Waste Activated Sludge (WAS) Station
The WAS station is designed to remove the excess biomass from the activated sludge system. Biomass can be removed as mixed liquor suspended solids (MLSS) from the common aeration basin effluent pipeline or from the discharge of the RAS pumping system. MLSS is wasted directly to the trunk sewer, which is treated at RP-1. Wasted RAS is discharged to the emergency lagoon.

Emergency Lagoon
The emergency lagoon is located at the southern end of the plant. The primary function of the lagoon is to recycle the filter effluent backwash from the trident filters and aqua aerobics filters. Secondary scum and plant drainage are also diverted to the lagoon. The recycled flow is pumped into the anoxic basin diversion structure or can be diverted to Regional Plant No.1

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Secondary Treatment Process	14.0 MGD	
Anoxic Basin Diversion Structure Gates	 6 units	
Anoxic Basin Mixer Gates	3 @ 7.0 MGD 3 @ 6.2 hp 6 units	Per unit Per Unit
Activate Sludge System Blowers Blower Valves Trains Depth Mixers Air Panels Valve Valve (air) MLR Pump MLR Valve	 3 @ 7.0 MGD 2 @ 8,000 scfm 500 hp 13.07 psig 1 @ 8,000 scfm 450 hp 9.00 psig 6 units 6 @ 1,54 MG 15.7 ft 6 @ 4 hp 463 per train 1 per train 6 units 6 @ 14,800 gpm 40 hp 6 units	 Per Unit Per Unit >14-inch Per Unit Per Unit > 18-inch > 12-inch Per Unit >30-inch
Mixed Liquor Diversion Structure Gates	 3 units	
Secondary Clarifier	3 @ 848 gpd/ft^2 16,500 ft^2	
RAS Pumping System Pump Valves	 3 @ 6,076 gpm 75 hp 15 units	 Per unit > 18-inch
WAS Station Valves	 3 units	 6-inch
Emergency Lagoon Pump Valves	1 @ 4.0 MG 2 @ - 3,155 gpm 75 hp 2 units	 Per unit > 16-inch

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Anoxic Basin Diversion Structure	3	3	3	3
Anoxic Basin	3	3	3	3
Activated Sludge System	4	4	4	4
Mixed Liquor Diversion Structure	3	3	3	3
Secondary Clarifiers	4	3	3	3
RAS Pumping System	3	3	4	4
WAS System	3	3	4	4
Emergency Lagoon	4	3	4	4

* These ratings are defined in Appendix A

4. Key Issues for Further Investigation

Anoxic Basin Diversion Structure
No issues require special attention.

Anoxic Basin
No issues require special attention.

Activated Sludge System
There are multiple broken air diffuser panels throughout the aeration basin system. Panels are isolated locally, and the isolation has drastically reduced the air flow through the system, negatively effecting treatment. PA15006 is a planned Agency-wide project that will replace the panels throughout the system.

The higher-pressure rated Kawasaki and Turblex blowers are inefficient. The Kawasaki blower is rated for a higher pressure than the two Turblex blowers and cannot run with the lower-rated blowers without failing when in auto. Therefore the Kawasaki can only run as a standalone blower, eliminating the reliable redundancy of the aeration blowers. A potential project will replace the Kawasaki blower.

Mixed Liquor Diversion Structure
No issues require special attention.

Secondary Clarifier
The secondary clarifier effluent launders and trough grow large amounts of algae, requiring manual removal. Clarifier No.1 valve has failed and has been replaced with a plug, and the other two clarifiers are assumed to be in the similar condition. A potential project will address these issues.

RAS Pumping System
The RAS wasting valve can only waste to the lagoon; excess solids in the lagoon create a septic environment and increased odors. The wasted RAS flow should be discharged directly to the sewer. The wasted flow meter reads erratically. A potential project will address these issues.

WAS Station
The flow meter is erratic when the valve is partially opened. The flow meter may not be full at all times. A potential project will address these issues.

Emergency Lagoon
The lagoon recovery pump station equipment is unreliable and has approached the end of its service life, due to the following reasons: the discharge Victaulic fittings leak, the air-reliefs plug, and pumps have difficulty priming. The flow meter is not connected to SCADA. The flow meter is dated and only reads as a percentage (i.e. 0 to 100%) on a local display. A potential project will address the pump station issues.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Anoxic Basin Diversion Structure	2009	
Anoxic Basin	1997 2009	Complete 2014 (Waiting on Report)
Activated Sludge System	1997 2003 2009	Complete 2014 (Waiting on Report)
Mixed Liquor Diversion Structure	2009	
Secondary Clarifiers	2009	Planned 15/16
RAS Pumping System	2009	
WAS Station	2009	
Emergency Lagoon	1997	

Table 4 Potential Projects

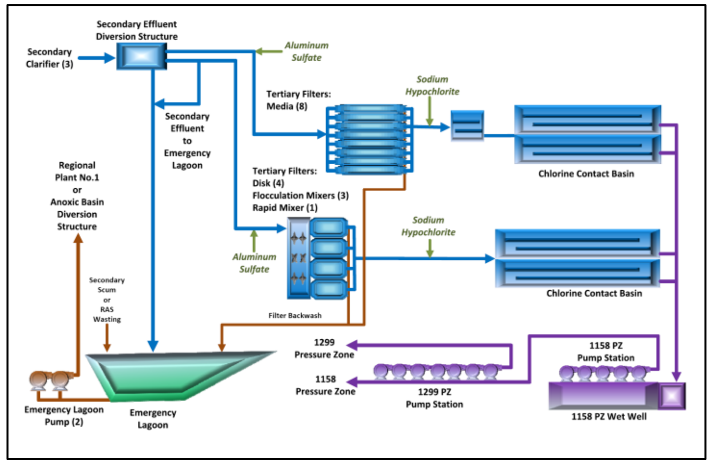
System	Project Name	Project Description
Activated Sludge System	RP-4 Process Improvements Phase II	Replace the Kawasaki blower.
Secondary Clarifier	RP-4 Process Improvements Phase II	Install weir washing units and replace drain valves on the secondary clarifiers.
RAS Pumping System	RP-4 Process Improvements Phase II	Retrofit the piping to flood the flow meter and wasted flows shall be diverted directly to the sewer.
WAS Station Pumping System	RP-4 Process Improvements Phase II	Retrofit the piping to flood the flow meter and wasted flows shall be diverted directly to the sewer.
Emergency Lagoon	RP-4 Process Improvements Phase II	Replace the lagoon recovery pump station pumps and ancillary equipment.

System Summary Continued on Next Page

Asset Management System Summary – RP-4

Tertiary Treatment Process

1. Asset Profile



Secondary Effluent Diversion Structure
The secondary effluent structure is fed through the bottom by a 66-inch pipe. Flow can be diverted to three different locations: the Trident media filters, Aqua-Aerobics Disk filters, or the emergency lagoon. The media filters are fed by a 36-inch pipe, the cloth filters are fed by a 48-inch pipe, and a 48-inch pipe is used to bypass flow to the emergency lagoon. A 30-inch pipe connects the Aqua-Aerobics system to the 48-inch bypass pipe.

Aluminum Sulfate (Alum) System
Chemicals can be added to the secondary effluent that is feeding either filtration system for the purpose of coagulation or pre-filter disinfection. Alum is stored in the maintenance building in two bulk storage tanks and at the trident filter building in two smaller transfer tanks. Bleach is stored in three bulk storage tanks in the maintenance building and is typically applied to the chlorine contact basin

Filters (Trident and Aqua-Aerobics)
The filtration systems consist of two different technologies: the Trident Anthracite Media Filters and the Aqua-Aerobics Disk Filters. Both technologies filter solids from the secondary effluent before undergoing their separate disinfection systems. The Trident filter must not exceed a filter loading rate of five gallons per minute per square foot (gpm/ft^2), and the Aqua-Aerobics filter cannot exceed a filter loading rate of six gallons per minute per square foot (gpm/ft^2). The Trident-filtered effluent feeds Chlorine Contact Basin 1A through a 36-inch pipe, and the Aqua-Aerobics-filtered effluent feeds Chlorine Contact Basin 2 through a 48-inch pipe.

Chlorination System
Disinfectant chemical, in the form of 12.5 percent solution sodium hypochlorite (bleach), is dosed to the filtered effluent at both locations: Chlorine Contact Basin 1A and Chlorine Contact Basin 2. The chlorine dose typically ranges from 5 to 15 milligrams per liter. The bleach is intimately mixed into solution using a mixer at the influent of both chlorine contact basins. Bleach is stored in three bulk storage tanks in the maintenance building.

Chlorine Contact Basins (CCB)
The facility is equipped with two chlorine contact basin systems. The Trident-filtered effluent feeds into a coupled chlorine contact basin consisting of Chlorine Contact Basin 1A and 1B, and Aqua-Aerobics-filtered effluent feeds into Chlorine Contact Basin 2. The chlorine contact basin effluent is required to meet California Department of Public Health's Title 22-approved disinfection contact time of 450 milligrams-minutes per liter and a modal contact time of 90 minutes to discharge into the recycled water distribution system. The final effluent is pumped into the recycled water distribution system; therefore, the final effluent does not need to be dechlorinated at RP-4.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Tertiary Treatment Process	14.0 MGD	
Secondary Effluent Diversion Structure Gates	3 units	
Alum System		
Tank	2 @ 2,200 gallons	Per unit
Transfer Tank	2 @ 400 gallons	Per unit
Transfer Pump	2 @ 90 gph 1 @ 124 gph	Per unit
Pump		
Trident Filters	2 @ 34.5 gph	Per unit
Aqua Filters	2 @ 12.5 gph	Per unit
Trident Filters		
Absorption Clarifier	8 @ 11 gpm/ft^2 140 ft^2	Per unit
Media Filter	8 @ 5 gpm/ft^2 313 ft^2	Per unit
Backwash Pump	2 @ 4,200 gpm 100 hp	Per unit
Backwash Blower	2 @ 1120 scfm 30 hp	Per unit
Valves	16 units	> 18-inch
Aqua Disk Filters	4 @ 5.8 gpm/ft^2 646 ft^2	Per unit
Rapid Mixer	1 @ 5 hp	
Flocculation Mixer	3 @ 1 hp	Per unit
Backwash Pump	8 @ 1,760 gpm 3 hp	Per unit
Helical Gear Drive	4 @ 15,597 lb.-inch ¾ hp	Per unit
Gates	3 units	
Valves	4 units	> 18-inch
Chlorination System		
Tank	3 @ 2,200 gallons	Per unit
Pump		
Trident Filters	1 @ 77 gph 1 @ 22.5 gph	
RAS Pipeline	1 @ 90 gph	
CCB1A	2 @ 180 gph	
CCB2	2 @ 124 gph	Per unit
SBS (O/S)	2 @ 46.9 gph	Per unit
Water champ Mixer	2 @ 30 gpm 7.5 hp	Per unit
Chlorine Contact Basin		
CCB1A & 1B	7.0 MGD 1.15 MG	T22 Report
CCB2	7.0 MGD 1.01 MG	T22 Report
Gates		
CCB1A	1 units	
CCB1B	2 units	
CCB2	2 units	
Valves		
CCB1B	1 units	> 18-inch

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Secondary Effluent Diversion Structure	3	3	3	3
Alum System	3	3	3	3
Trident Filters	4	3	4	4
Aqua-Aerobics Disk Filters	3	3	3	3
Chlorination System	4	4	4	4
Chlorine Contact Basin	4	3	3	4
Effluent Diversion Structure	3	3	3	3

* These ratings are defined in Appendix A

4. Key Issues for Further Investigation

Secondary Effluent Diversion Structure
No issues require special attention.

Alum System
No issues require special attention.

Trident Filters
The absorption media and filter media are routinely replaced by maintenance staff.

Multiple backwash, effluent, and waste valves do not isolate completely, flow is wasted to the lagoon and recirculated within the plant. Also, many actuators leak air or are no longer utilized. A potential project will replace the worn equipment.

Aqua-Aerobics Disk Filters
No issues require special attention.

Chlorination System
The bleach containment area is not coated, and the concrete tank pads, metal supports, and the containment walls are showing signs of corrosion. In addition, bleach has seeped past the containment area to damage a door and walls outside of the containment area. The leaking bleach wears the ancillary equipment prematurely.

The three bleach storage tanks are 2,200 gallons each, but due to the overflow penetration location on each tank, the storage capacity has been reduced to 2,000 gallons. The total storage capacity of 6,000 gallons leaves limited flexibility to receive full load deliveries of 4,800 gallons. In addition, the east alum tank and ancillary equipment located directly across from the bleach containment are abandoned.

The bleach metering pumps are diaphragm technology. These pumps lose suction prime when offline and require manual operation to degas the suction pipeline. Although all the pumps are diaphragm, there is no standardized pump manufacturer. In addition, the maintenance on the diaphragm is time consuming and expensive.

The chlorine dosing system is currently operating without backup injection pipelines. CCB1A does not have an operational backup bleach injection pipeline. Both CCB2 injection pipelines are offline due to leaks; the locations of the leaks are unknown due to the pipeline being buried under asphalt. Finally, the Aqua Disk Filters do not have a bleach injection pipeline for pre-filter chlorination. Algae will blind the filter media, resulting in more frequent backwashes.

Project EN14018 will address issues within the chlorination system.

Chlorine Contact Basin (CCB)
There are gaps on the chlorine contact basin covers, and sand and debris infiltrate the structure. The basins have not been inspected since construction.

The CCB1A effluent gate needs to be repaired, replaced, or removed from operation. Controls for the gate are outdated and approaching the end of its service life. A potential project will replace the gate and controls.

Effluent Splitter Box
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Secondary Effluent Diversion Structure	2009	
Alum System	1997 2009	
Trident Filters	1997	Planned 15/16
Aqua-Aerobics Disk Filters	2009	
Chlorination System	2003 2009	
Chlorine Contact Basin	2003 2009	Planned 15/16
Effluent Splitter Box	2003	

Table 4 Potential Projects

System	Project Name	Project Description
Trident Filters	RP-4 Process Improvements Phase II	Replace worn filter ancillary equipment.
Chlorine Contact Basin	RP-4 Process Improvements Phase II	Replace gate and controls on CCB1A.

System Summary Continued on Next Page

Asset Management System Summary – RP-4
Auxiliary Systems
1. Asset Profile

Electrical System
The electrical energy to power the treatment facility is obtained from the local electrical grid (SCE) and from onsite energy generation (wind and emergency generators). The wind asset is owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the power panel switch gear, where transformers and switchgear are located to distribute electrical energy throughout the facility. A single line diagram of the RP-4 electrical system is shown in Appendix B.

Diesel emergency generators are used in the event of a power failure. One outside generator is located in the northern portion of the facility and supplies power to the preliminary, primary, secondary, and tertiary sections.

An extensive lighting system is needed to illuminate the facility during dark hours. Most lighting fixtures are equipped with light sensors to turn off when sufficient lighting is provided from the sun. Lighting units are inside each of the process buildings, on equipment walls, and along the roadways for safety.

Utility Water System
Utility water is used throughout the facility to clean, supply pump seal water, cool, dilute, flush clogged pipes, irrigate, and more. The system is supplied by the 1158-foot pressure zone pump station. The piping consists of several isolation valves and point-of-use connections.

Potable Water System
Potable water is used throughout the plant for restrooms, cooling, odor scrubber dilution water, fire suppression, and more. The system is supplied by three connections on 6th Street from the Cucamonga County Water Department. The system has several backflow devices to protect the drinking water system.

Instrumentation and Control System
An extensive array of instruments is used to monitor and control the processes at RP-4. Nearly all the processes at the plant are observed and controlled from a centralized SCADA system. Control wiring and local panels are provided at individual pieces of equipment, and control wiring transmits data to the main control centers.

Yard Piping
A substantial network of pipes is used to convey flows between unit processes. The material, sizes, and service conditions of these pipes vary widely. A yard piping diagram is show in Appendix C.

2. Capacity Profile
Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Electrical System		
Utility Voltage	1 @ 12 kV	
Transformers	8 @ 12 kV to 480 V	
Switchgear	10 @ 12 kV	
Distribution	5 @ 480 V	MCCs
Generator	1 @ 2,000 kW 2,847 Bhp	
Wind Turbine	1 @ 1 MW	
Mounted Lighting	> 50 units	
Utility Water System		
Pipelines	Various sizes	
Pump Station	See *1158 Pressure Zone*	
Valves	2 units	6-inch
Potable Water System		
Backflow Devices	5 units	>2-inch
Valves	10 units	>2-inch
Instrumentation and Control System		
HMI Workstation	8 units	
PLC	7 units	
I/O Hub	5 units	
Radio Transmitter	1 unit	
Yard Piping	See Appendix C	

3. Asset Ratings
Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Electrical System	3	3	3	3
Utility Water System	3	3	4	4
Potable Water System	3	3	3	3
Instrumentation and Control System	3	3	3	3
Yard Piping	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation
Electrical System
No issues require special attention.

Utility Water System
The plant utility water is not monitored from the 1299 recycled water pump station.

There are very few recycled water connections greater than 1 ½" around the plant. The ½" recycled water connections throughout the plant do not provide sufficient pressure or flow for cleaning large tanks.

If the plant's tertiary treated wastewater does not meet recycled water compliance standards, the 1158 and 1299 recycled water pump stations are taken offline. Unfortunately, noncompliant water is left within the contact basins and has to be pumped to the lagoon through the 1158 recycled water pump station which requires manually manipulating three large valves. Manipulating large valves is time consuming and increases the amount of time to start producing compliant recycled water again through the plant.

A potential project will address the system issues.

Potable Water System
No issues require special attention.

Instrumentation and Control System
No issues require special attention.

Yard Piping
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Electrical System	1993 1995 2001 2005	
Utility Water System	2002	
Potable Water System	1993 2003	
Instrumentation and Control System	1995 2001 2003 2005	
Yard Piping	1993 1995 2001 2005	

Table 4 Potential Projects

System	Project Name	Project Description
Utility Water System	RP-4 Process Improvements Phase II	Install a utility water flow meter with manual bypass, install additional 1 ½" utility water connections, and install actuators to automate recycled water valves.

End of System Summary

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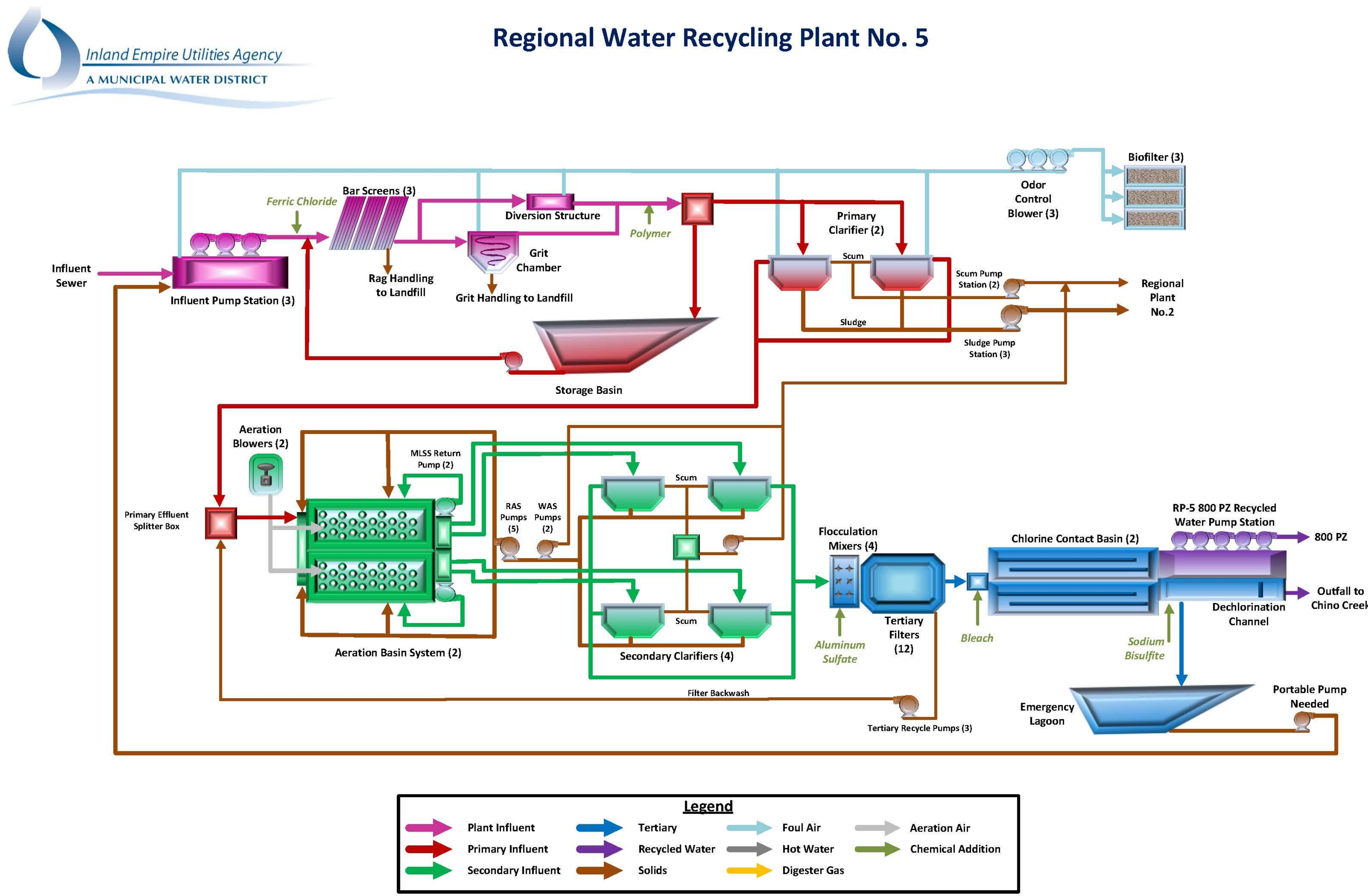

Figure 7-5: Regional Water Recycling Plant No. 5 (RP-5) – Schematic

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Table 7-6: Regional Water Recycling Plant No.5 – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN09023	RP-5 SHF/REEP Independent Evaluation	Provide technical support to Inland Bioenergy (Lessee of RP-5 SHF/REEP)	RC	CC	25,000										25,000
2	EN11031	RP-5 Flow Equalization and Effluent Monitoring	The RP-5 Flow Equalization and Effluent Monitoring consist of modifications in the primary effluent splitter box. The 12' weir gate and automation of the slide gate to allow flow to the aeration basin will better optimize the flow equalization of plant treatment process.	RC	CC	1,200,000	0	0	0	0	0	0	0	0	0	1,200,000
3	EN19001	RP-5 Liquid Treatment Expansion	Expand existing RP-5 liquid treatment capacity from 15 to 22.5 mgd. Project cost estimated at $75M. (include RP-5 satellite warehouse & MM shop)	RC	CC	0	0	2,000,000	10,000,000	19,000,000	29,000,000	29,000,000	29,000,000	7,000,000	0	125,000,000
4	EN19006	RP-5 Solids Treatment Facility - RC	Construct new solids handling facility at RP-5 to decommission RP-2.	RC	CC	0	2,000,000	5,000,000	18,000,000	18,000,000	17,000,000	8,000,000	0	0	0	68,000,000
5	TBD	RP-5 Process Improvements	Project to provide various process improvements that couldn't be addressed under EN11031 (e.g., secondary effluent diversion to lagoon, headworks fine screens, grit piping modifications, lagoon pump station, weir washers, influent wet well cleaning.)	RC	CC	0	0	0	0	300,000	3,500,000	2,500,000	0	0	0	6,300,000
6	TBD	RP-5 Expansion PDR	As defined by WWFMP, includes both solids and liquids facilities	RC	CC	1,000,000	500,000	0	0	0	0	0	0	0	0	1,500,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014

(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)

(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

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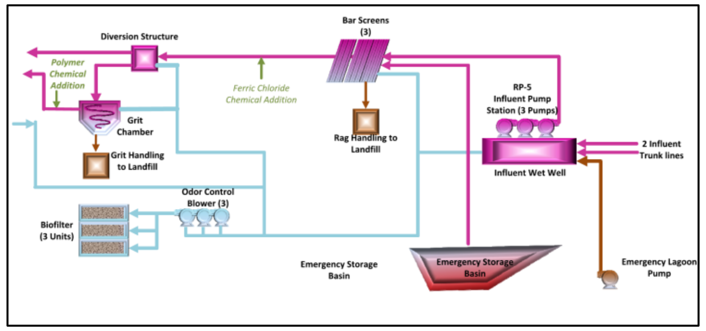
Asset Management System Summary – RP-5

Preliminary Treatment Process

1. Asset Profile



Influent Trunk Lines
Raw wastewater enters RP-5 through the 42-inch Chino interceptor diversion and 66-inch Kimball interceptor.

Influent Pump Station (IPS)
The influent pump station collects raw sewage from the 42-inch Chino interceptor diversion and 66-inch Kimball interceptor. The streams enter the influent junction box and flow through manually-operated isolation gates into two separate wet wells. The RP-5 influent pump station conveys plant influent flow to the headworks. Once lifted to the headworks, flow proceeds through the entire plant by gravity. Three VFD-controlled, wet-pit submersible, non-clogging, centrifugal pumps located in the IPS wet wells lift the combined flow and convey the raw sewage to the headworks through a 42-inch diameter discharge line. The west wet well holds two pumps, while the east wet well holds the third pump, with space for one future pump. A 36-inch-diameter magnetic flow meter in the combined discharge line measures the flow.

Screening Equipment
The headworks consist of bar screens with screenings washers and compactors and also grit basins with grit washers. Two mechanical climber-type bar screens are installed along with a screw conveyor and screenings washer/compactor. One manual bar screen is also installed as a standby unit.

Vortex Grit Chamber
When wastewater leaves the bar screen channels, it enters a mechanically induced vortex grit basin, which separates the heavier grit particles from the lighter organics. The heavier particles settle to the bottom of the chamber from where they are removed from the basin by the constant-speed recessed impeller grit pumps.

Grit Washing/Disposal System
The grit removal system separates grit, sand, and other heavy particles from lighter organics in the influent wastewater flow, removing this material to protect downstream equipment and processes. The fluidized grit is pumped to the grit washers, where it is dewatered before being discharged into disposal bins. The grit washers include a cyclone separator to remove additional water and concentrate the solids. They also contain a classifier mechanism that accepts the underflow from the cyclone unit. This classifier further separates the solids using a screw mechanism to transport the grit upward out of a settling tank.

The grit removal system includes manually operated gates and valves to allow for bypassing each component of the facility. The duty pump and duty grit washer are selected by opening the appropriate manually operated plug valves. There are provisions to accommodate the expansion of the grit removal system if needed. A second grit basin could replace the existing grit basin bypass pipeline, and a third pump can be added to the grit pumping station.

The excess liquid spills out of the grit classifiers and is directed back to the bar screen structure effluent channel.

Screening Conveyance/Disposal System
Screening collected by the bar screens is transported by a conveyor and dropped into a hydraulic washer-compactor. The compactor compresses the collected rags, squeezing out excess water, and pushes the rags to the roll-off bin.

Ferric Chloride System
Ferric chloride is added to the liquid flow after grit removal to increase solids capture during primary treatment and to control odors caused by hydrogen sulfides.

The ferric station consists of a truck filling station, 9,600-gallon storage tank, three chemical metering pumps and associated piping.

Polymer System
Polymer is added to the liquid flow before grit removal to enhance primary treatment. The polymer system includes two 500-gallon tote stands, chemical metering pumps, mixing chamber, and associated piping. The anionic polymer system is located in the same area as the ferric chloride system. The polymer system consists of two polymer storage totes and two polymer blenders. Anionic polymer is drawn from the storage totes, mixed and diluted with potable water, and delivered to the primary clarifier splitter box. Space and connections for future polymer blenders are provided to accommodate future plant flows.

Biofilter
Odors collected in the preliminary and primary treatment processes are forced through three biofilter media cells, where hydrogen sulfide gas is removed through biological processes.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Preliminary Treatment Process	16.3 MGD	
Influent Trunk Sewer Kimball Interceptor Chino Interceptor	 66-inch 42-inch	
Influent Pump Station Valves	3 @ 8,333 gpm 200 hp 7 units	Per Unit > 18-inch
Screening Equipment Mechanical Screen Manual Screens	 2 @ 30 MGD each 1 @ 30 MGD	Per Unit
Vortex Grit Basin Chamber Pump Gates	 1 unit @ 30 MGD 2 @ 250 gpm 25 hp 2 units	Per Unit
Grit Washing/Disposal Classifiers	 2 @ 13 ft^3/hr	Per Unit
Screening Conveyance & Disposal System Conveyor Washer Compactor	 1 @ 5.0 hp 1 @ 32 ft^3/hr	
Ferric Chloride System Tank Pumps	 9,600 gallons 2 @ 53 gph	Per Unit
Polymer System Pump	 2 @ 4.5 gph	Per Unit
Biofilter Cells	 3 @ 667 ft^3	Per Unit
Blowers	3 @ 13,200 scfm 30 hp	Per Unit

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Influent Trunk Sewer	3	3	3	3
Influent Pump Station	3	3	3	3
Screening Equipment	3	3	3	3
Vortex Grit System	3	3	3	3
Grit Washing/ Disposal System	3	3	3	3
Screening Conveyance/Disposal System	3	3	3	3
Ferric Chloride System	3	3	3	3
Polymer System	3	3	3	3
Headworks Splitter Box	3	3	3	3
Biofilter	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Influent Trunk Sewer
No issues require special attention.

Influent Pump Station
The influent pump station wet well accumulates floating debris which does not get pumped by the submersible pumps. The wet well needs routine Vactor cleaning, which is tedious and inefficient.

Screening Equipment
Fine screens are being considered to replace the current bar screens. The new fine screens will screen out smaller unwanted inorganics to pass through into the system, allowing for better and more efficient process treatment.

Vortex Grit System
No issues require special attention

Grit Washing/Disposal System
No issues require special attention

Screening Conveyance/Disposal
No issues require special attention

Ferric Chloride System
No issues require special attention.

Polymer System
No issues require special attention.

Biofilter
No issues require special attention, but routine media replacement is required to maintain facility air-quality compliance. A more efficient system should be installed to reduce frequent re-occurring media replacement.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Influent Trunk Sewer	2004	
Influent Pump Station	2004	Planned 2015
Screening Equipment	2004	Planned 2015
Vortex Grit Basin	2004	Planned 2015
Grit Washing/Disposal	2004	Maintenance Inspection 2014
Screening Conveyance & Disposal System	2014	Planned 2015
Ferric Chloride System	2004	
Polymer System	2004	
Biofilter	2004	Maintenance Inspection 2014

Table 4 Potential Projects

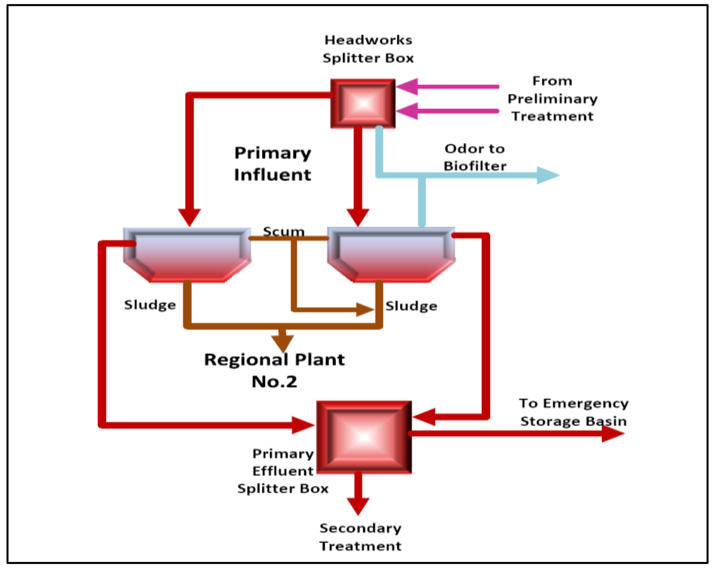
System	Project Name	Project Description
Influent Pump Station	RP-5 IPS Wetwell Self Cleaning Automation	Automatically clean the RP-5 IPS wet-well by installing new equipment.
Screening Equipment	RP-5 Headworks Screening Replacement	Install fine screens to replace the current bar screens. The new fine screens will screen out smaller unwanted inorganics to pass through into the system, allowing for better and more efficient process treatment.
Biofilter	RP-5 Odor Control Modifications	Modify existing biofilters to new bio-scrubbers or more efficient means of odor control.

System Summary Continued on Next Page

Asset Management System Summary – RP-5

Primary Treatment Process

1. Asset Profile



Headworks Splitter Box
The headworks splitter box receives flow from the grit systems, bar screen channel, and the bar screens structure bypass. Distribution valves in this area direct the wastewater flow to Primary Clarifiers 3 and 4.

Primary Clarifiers
There are two circular primary clarifiers located north of the aeration basins at RP-5. Each covered clarifier is 100 feet in diameter, with a sidewall depth of 12 feet. The average surface overflow rate for each clarifier is 8.3 MGD, with a maximum of 15 MGD. The solids that settle out in the clarifiers are pumped to RP-2 for treatment. The clarified flow passes over a weir and into the aeration basins.

Primary Effluent Splitter Box
The primary effluent from the clarifiers flows into the primary effluent splitter box. The purpose of the splitter box is to allow diversion of the primary clarifier effluent to either the aeration basin or the emergency storage basin. The amount of flow directed to either structure can be adjusted from slide gates.

Sludge Pumping System
The primary sludge pump station pumps settled sludge from the primary clarifiers sludge hoppers to the solids handling facilities at RP-2. There are three primary sludge pumps: one dedicated to each primary clarifier and one that serves as a common standby. Each pump suction line contains a sludge grinder (Muffin Monster) to reduce the size of the pumped solids and help prevent plugging. Sludge withdrawal from each clarifier is controlled by adjustable pumping cycles to maintain a constant sludge blanket level within the clarifier.

Scum Pumping System
Scum arms with a skimmer mechanism remove scum from the clarifier water surface. Scum deposits into the scum beach and then flows by gravity into a main scum wet well that receives scum from both primary clarifiers. The scum well has a mixer to help ensure that the scum does not thicken and result in pumping difficulties.

Emergency Overflow Pond
The unlined 17 MG emergency storage basin (located downstream of the dechlorination basin at the end of the plant) can be used to store final plant effluent if the effluent does not meet the permit requirements. The basin does not have a permanent pumping facility, but it has the capability to return flow to the headworks through a 16-inch line with the use of temporary pumps. This same line can be used to divert flow (by gravity) from the influent pump station wet well to the emergency overflow pond in an emergency situation.

Emergency Storage Basin (ESB) System
Downstream of the primary clarifiers, there is a primary effluent box with an adjustable weir gate that can be used to divert flow to the 6.8 MG emergency storage pond. The weir gate is manually set such that primary effluent in excess of a selected flow rate goes over the weir gate into the lagoon. The effluent is then pumped back to the headworks when the influent rate is low enough to allow all flow to continue to downstream processes.

The Emergency Storage Basin Pump Station returns diverted primary effluent to the headworks-structure bar-screen influent channel. Three VFD-controlled, wet-pit submersible, non-clog, centrifugal pumps located in the wet well lift the diverted primary effluent and transmit it to the headworks through a 20-inch-diameter transmission line.

A variety of instruments is installed at the ESB pump station to collect data and control operation of the pumps. A 20-inch-diameter magnetic flow meter in the combined discharge line measures the combined discharge flow and transmits the information to the Supervisory Control and Data Acquisition (SCADA) control system. A level transmitter and high- and low-low level switches monitor the liquid level in the wet wells and provide information to control the pumps.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Primary Treatment Process	16.3 MGD	
Headworks Splitter Box Gates	3 units	
Primary Clarifiers Drive Gates	2 @ 2,075 gpd/ft² 7,854 ft² 1 @ ¾ hp 2 units	Per Unit
Primary Effluent Splitter Box Gates	2 units	
Sludge Pumping System Pumps	3 @ 230 gpm 30 hp	Per Unit
Scum Pumping System Pump	2 @ 230 gpm 15 hp	Per Unit
Emergency Overflow Pond	1 @ 17 MG	Unlined
ESB System Basin VFD Pumps	1 @ 6.8 MG 3 @ 3,000 gpm 60 hp	Per Unit

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Headworks Splitter Box	3	3	3	3
Primary Clarifiers	4	3	3	3
Primary Effluent Splitter Box	3	3	4	3
Sludge Pumping System	3	3	3	3
Scum Pumping System	3	3	3	3
Emergency Overflow Pond	4	3	4	3
ESB System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Headworks Splitter Box
No issues require special attention.

Primary Clarifiers
Condition assessment of the East primary clarifier revealed significant coating failure of metallic surfaces. It is recommended to repair the severely corroded areas on the skimmer arms and steel in the vapor space as soon as possible or the next maintenance interval.

Primary Effluent Splitter Box
Modifications to the 12-foot weir gate and automation of the slide gate to allow flow to the aeration basin will better optimize the flow equalization of plant treatment process. Project EN11031 will address this issue.

Sludge Pumping System
No issues require special attention.

Scum Pumping System
No issues require special attention.

Emergency Overflow Pond
Temporary pumps must be used to pump flows from the pond to the headworks. There are no operational impacts at this time, and will likely be addressed when a new RP-5 solids handling facility is built.

It is unknown whether the pond is intended as a containment system. A survey of historical record does not reveal whether compacted clay liner or geomembrane was used. The pond has 6 feet of accumulated solids. There are no operational impacts at this time, and will likely be addressed in the RP-5 Expansion.

ESB System
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Headworks Splitter Box	2004	Planned 2015
Primary Clarifiers	2004	East 3A – 2013 West 4A – 2015 Planned
Primary Effluent Splitter Box	2004	Planned 2015
Sludge Pumping System	2004	
Scum Pumping System	2004	
Emergency Storage Basin	2004	
ESB System	2004	

Table 4 Potential Projects

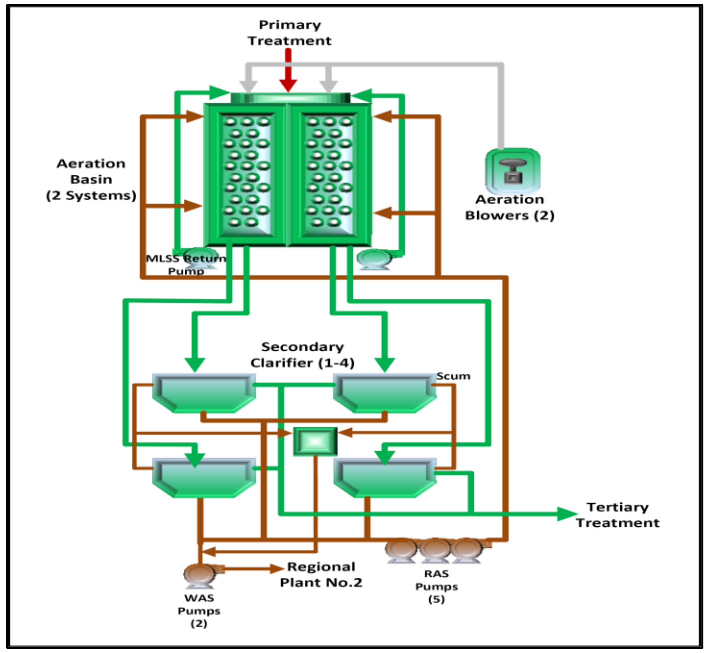
System	Project Name	Project Description
Emergency Overflow Pond	RP-5 Emergency Overflow Pond Pumps Station	Install permanent pump station to return flows from the EOP to the headworks. Concrete line the Emergency Overflow Pond.

System Summary Continued on Next Page

Asset Management System Summary – RP-5

Secondary Treatment Process

1. Asset Profile



Activated Sludge System
The activated sludge system is two-stage biological-nutrient-removal suspended-growth system that provides biological treatment to convert soluble BOD to biomass able to settle. The activated sludge consists of biological processes that use dissolved oxygen to promote the growth of biological flocculation, which then removes organic material. The process converts ammonia to nitrites, nitrates, and ultimately nitrogen gas. There are two aeration basins (four trains) located south of the primary clarifiers. Each aeration basin contains eleven zones. Four zones in each basin are dedicated anoxic zones, and seven zones are available aeration zones.

The aeration zones are aerated via the Parkson air membrane system supplied by two single-stage centrifugal blowers with inlet/variable diffuser guide vanes and motorized butterfly control valves that control dissolved oxygen concentrations. Each aeration basin contains up to eight pairs of anoxic mixers to minimize solids settlement in anoxic zones. Influent gates divert a combined flow of primary effluent and return activated sludge available to feed three zones on each aeration basin. Each aeration basin contains a mixed liquor return pump in the effluent channel, which can be used to pump nitrate-rich mixed liquor back to the aeration basin, where denitrification can occur.

Secondary Clarifiers
Effluent flow from the aeration basins is transferred through 36-inch gravity pipelines into the secondary clarifiers (four in total) through the bottom of the center column. The flow then travels up into a feed well that contains a flocculation zone. The flow passes through diffusers in the side of the feed well and is directed toward the bottom of the clarifier by a baffle. Each clarifier has a rotating sludge and ducking skimmer arm to collect scum off the surface. The solids settle to the bottom of the clarifier and are either returned to the aeration basin or wasted to RP-2. The overflow effluent is directed through a 54-inch pipeline to the tertiary filters.

Return Activated Sludge (RAS) Pumping System
Some of the settled sludge in the secondary clarifiers is pumped back to the influent of the aeration system as return activated sludge (RAS) to mix with primary effluent, called mixed liquor suspended solids (MLSS). The RAS is returned to the aeration basin by the 5 RAS pumps to maintain the biological process.

Waste Activated Sludge (WAS) Pumping System
To control the excess biological concentrations in the aeration system, the settled solids from the secondary clarifiers are "wasted" and pumped out of the secondary system to solids processing as waste activated sludge (WAS). WAS is pumped to and treated at RP-2.

Scum Pumping System
Scum collected from the skimmer arm of the secondary clarifiers is routed to a scum well, where it is pumped out of the system to solids processing at RP-2.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Secondary Treatment Process	17.1 MGD	
Activated Sludge System Blowers Trains Panels Depth Mixers Gates Valve MLR Pumps	2 @ 17.1 MGD 2 @ 7,500 scfm 500 HP 11.5 psig 2 @ 5.16 MG 195 19 ft 20 @ 7.5 hp 32 units 1 unit 2 @ 6,300 gpm	 Per Unit Per Unit Per System Per System Per System
Secondary Clarifiers Gates	4 @ 356 gpd/ft^2 13,273 ft^2 4 units	Per Unit
RAS Pumping System Valves	5 @ 2,500 gpm 3 - 20-inch units	Per Unit
WAS Pumping System	2 @ 100 gpm 7.5 hp	
Scum Pumping System	2 @ 600 gpm 15 hp	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Activated Sludge System	3	2	2	2
Secondary Clarifiers	3	3	3	3
RAS Pumping System	3	3	3	3
WAS Pumping System	3	3	3	3
Scum Pumping System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Activated Sludge System
No issues require special attention.

Secondary Clarifiers
Algae control in the launders is a challenge. Automated weir-washing systems may be installed during future clarifier rehab work. A conditions assessment is planned for FY 2015/16 for all four clarifiers.

RAS Pumping System
No issues require special attention.

WAS Pumping System
No issues require special attention.

Scum Pumping System
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Activated Sludge System	2004	
Secondary Clarifiers	2004	Planned 15/16
RAS Pumping System	2004	
WAS Pumping System	2004	
Scum Pumping System	2004	

Table 4 Potential Projects

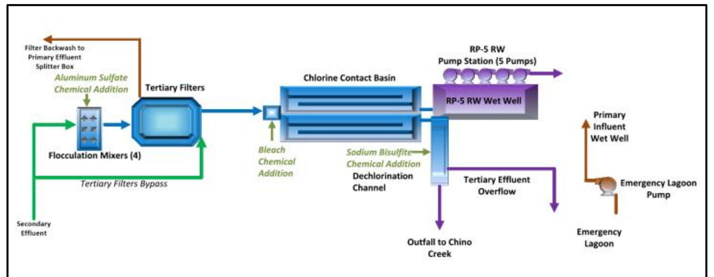
System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – RP-5

Tertiary Treatment Process

1. Asset Profile



Aluminum Sulfate (Alum) System
Alum is used with cationic polymer to provide flocculation upstream of the tertiary filters. The addition of these two chemicals should result in an increase in floc size, which will increase particulate removal by the filters. The alum system consists of a storage tank and two chemical metering pumps in a duty/standby mode of operation. Alum is drawn from the storage tank and pumped to the influent channel to the tertiary filters. Space and connections for an additional future tank and chemical pumps are provided to accommodate future plant flows.

Flocculation Tank
To provide optimum removal of particulates during the filtration process, chemicals are added at the flocculation tank at the influent side of the filters. There is one rapid mixer and four VFD-controlled flocculators at this site.

Filters
The Parkson continuous backwash tertiary filters provide physical treatment to remove suspended solids and lower the turbidity of the secondary effluent. There are twelve tertiary filters and a filter recycle pump station with three submersible pumps that return filter backwash to the primary effluent splitter box. The tertiary filters are located south of the secondary clarifiers. Each tertiary filter contains six 50-square-foot modules. Flow that enters the tertiary filters comes from the secondary clarifiers. Secondary effluent is injected with chemicals to aid with filtration in the rapid mix and flocculation basin. The effluent travels through three pipes, each of which provides influent to a group of four filters. Filter influent then travels through the filter feed valves and into each filter influent manifold, where it is distributed to the bottom of each module.

Chlorination System
The sodium hypochlorite system has multiple applications throughout the plant. The main purpose of the system is to provide disinfection of the plant effluent before final discharge. Hypochlorite (bleach) may also be used for housekeeping purposes. It can be added to the return activated sludge (RAS) to prevent the growth of filamentous organisms, which inhibit good settling in the secondary clarifiers. It can also be added to the secondary clarifier weirs and to the tertiary filter influent channel to prevent the growth of algae in these areas.

The sodium hypochlorite system consists of four storage tanks and three sets of chemical metering pumps. One set, consisting of five pumps, is used for disinfection. This set pumps hypochlorite to the chlorine mixer at the beginning of the chlorine contact basin. The second set of two pumps is used for RAS dosing and sends hypochlorite to the RAS line before the aeration basin. The third set of two pumps is used for algae control. This set pumps hypochlorite into a dilution water line and the mixture is sent to the secondary clarifier weirs and filter influent channel. Space and connections for future RAS and algae control chemical pumps are provided to accommodate future plant flows.

The filter recycle pump station consists of three submersible pumps, which return tertiary filter backwash to the primary effluent splitter box.

Chlorine Contact Basins
After flow passes through the tertiary filters, it enters the chlorine contact channels, where the water is chlorinated and then mixed to improve disinfectant contact and obtain the necessary compliance concentration and detention times. The chlorinated water then travels through a serpentine pattern of channels to recycled water demand or the dechlorination channel, where the chlorine is removed from the water before discharge to the outfall.

Dechlorination System
Flow entering the dechlorination structure is injected with sodium bisulfite (SBS) and travels through a serpentine flow path, allowing SBS to neutralize any chlorine residual before flowing into Chino Creek through a 48-inch effluent flow meter and out through an outfall 60-inch pipeline. SBS is stored in two large chemical tanks and is metered into the system via four chemical metering pumps.

The dechlorination basin final effluent gate is used to stop plant effluent flow to the outfall, if the final effluent flow does not meet water quality standards. The dechlorination basin final effluent gate is a motorized sluice gate. When it is closed, flow is diverted over a 23-foot-long, fixed, broad-crested weir and through a pipeline into the adjacent emergency lagoon.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Tertiary Treatment Process	16.3 MGD	
Alum System Tank Pumps	 560 gallons 2 @ 14 gph	 Per Unit
Flocculation Tank Rapid Mixer Mixer	 1@ 30 hp 1@ 3 hp 1@ 2 hp 1 @ 1.5 hp 1@ 1 hp	
Filters Filter Loading Recycle Pumps Gates	12 @ 300 ft^2 5 gpm/ft^2 3 @ 420 gpm 7.5 hp 1 units	Per Unit Per Unit
Chlorination System Tanks Pumps Water Champ Mixer	 4 @ 10,500 gallons 9 @ 77 gph 1 @ 20 hp 1 @ 30 hp	 Per Unit Per Unit
Chlorine Contact Basins Gates	2 @ 0.9 MG 4 units	Per Unit
Dechlorination System Tanks Pumps Gates	 2 @ 5,100 gallons 4 @ 53 gph 3 units	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor: Condition	Redundancy	Function	Reliability
Alum System	3	3	3	3
Flocculation Tank	3	3	3	3
Filters	4	3	4	4
Chlorination System	4	3	3	3
Chlorine Contact Basins	3	3	3	3
Dechlorination System	4	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Alum System
No issues require special attention. .

Flocculation Tank
No issues require special attention.

Filters
The filters require significant maintenance. The continuous and abrasive sand-washing action damages OEM stainless-steel air-lift pumps, which need to be replaced routinely with PVC air-lift pumps. Sand gets carried to the backwash water-wet well and then is pumped to the primary effluent splitter box. The performance of the sand-washing system is difficult to maintain. These issues will be addressed in future rehab work.

Chlorination System
The current sodium hypochlorite (bleach) dosing system requires significant maintenance as a result of leaking pumps. The pumps are located outdoors and have no protection against the elements. Crystallization of the bleach at the discharge of the pipe has caused issues. Chemical flow metering is being considered for chlorine dosing. Project EN11031 is expected to address these issues.

Chlorine Contact Basins (CCB)
The chlorine contact basin does not have a flow meter at the influent. Flow into the CCB influent is back-calculated, which causes delayed bleach-dosing issues. The mixing of bleach at the CCB is not optimal. Project EN11031 is expected to address these issues.

Dechlorination System
The sodium bisulfite (SBS) pumps are near the end of their useful life, and the pumps don't have the operating range to meet the variations in dechlorination needs resulting from variable recycled water demands. Project EN11031 is expected to address these issues.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Filters	2004 2009	
Alum System	2004	
Flocculation Tank	2004	
Chlorination System	2004 2010	
Chlorine Contact Basins	2004	
Dechlorination System	2004 2010	

Table 4 Potential Projects

System	Project Name	Project Description
Filters	RP-5 Tertiary Filters Modifications	Install new tertiary filter system with less maintenance and better performance.

System Summary Continued on Next Page

Asset Management System Summary – RP-5

Auxiliary Systems

1. Asset Profile

Plant Drain
The plant drain collects surface storm runoff, excess irrigation, and wash-down water collected in submersible drains located throughout the facility. The drain system receives gravity flows to a wet well, where the flow is then pumped and recycled toward the head of the treatment process.

Electrical System
The electrical energy to power the treatment facility is obtained from the local electrical grid (SCE) and from onsite energy generation (solar and emergency generators). The solar assets are owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the power panel switchgear, where transformers and switchgear are located to distribute electrical energy throughout the facility. A single line diagram of the RP-5 electrical system is shown in Appendix B.

Diesel emergency generators are used in the event of a power failure. Two generators are located at the south section and supply power to the preliminary, primary, secondary, tertiary sections, and headquarters

An extensive lighting system is needed to illuminate the facility during dark hours. Most lighting fixtures are equipped with light sensors to turn off when sufficient lighting is provided from the sun. Lighting units are inside each of the process buildings, on equipment walls, and along the roadways for safety.

Utility Water System
Utility water is used throughout the facility to clean, supply pump seal water, cool, dilute, flush clogged pipes, irrigate, and more. The system is supplied by the RP-5 RW pump station. The piping consists of several isolation valves and point-of-use connections.

Potable Water System
Potable water is used throughout the plant for restrooms, cooling, odor scrubber dilution water, fire suppression, and more. The system is supplied from a 6-inch W1 line off Kimball Ave. from the City of Chino. The system has several backflow devices to protect the drinking water system.

Instrumentation and Control System
An extensive array of instruments is used to monitor and control the processes at RP-5. Nearly all the processes at the plant are observed and controlled from a centralized SCADA system. Control wiring and local panels are provided at individual pieces of equipment, and control wiring transmits data to the main control terminals.

Yard Piping
A substantial network of pipes is used to convey flows between unit processes. The material, sizes, and service conditions of these pipes vary widely. A yard piping diagram is show in Appendix C.
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2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Electrical System		
Utility Voltage	1 @ 12 kV	
Transformers	6 @ 12 kV to 480 V	
Switchgear	8 @ 12 kV	
Distribution	3 @ 480 V	MCCs
Generator	2 @ 1,000 kW	
Mounted Lighting	> 50 units	
Utility Water System		
Pipelines	Various sizes	
Pump Station	2 @ 1,925 gpm 3 @ 1,925 gpm	
Valves	30 units	
Potable Water System		
Backflow Devices	>25 units	
Valves	>25 units	
Instrumentation and Control System		
HMI Workstation		
RTU		
PLC		
I/O Hub		
Radio Transmitter	1	
Yard Piping	See Appendix C	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Plant Drain	3	3	3	3
Electrical System	3	3	3	3
Utility Water System	3	3	3	3
Potable Water System	3	3	3	3
Instrumentation and Control System	2	2	2	3
Yard Piping	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Plant Drain
No issues require special attention.

Electrical System
No issues require special attention.

Utility Water System
Some of the UW isolation valves do no seal and need to be replaced. Replaced valves should be exercised routinely. The IEUA RW valve exercise program will address this issue.

Potable Water System
No issues require special attention.

Instrumentation and Control System
No issues require special attention.

Yard Piping
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Plant Drain	2004	
Electrical System	2004	
Utility Water System	2004	
Potable Water System	2004	
Instrumentation and Control System	2004	
Yard Piping	2004	

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

End of System Summary

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Inland Empire Utilities Agency
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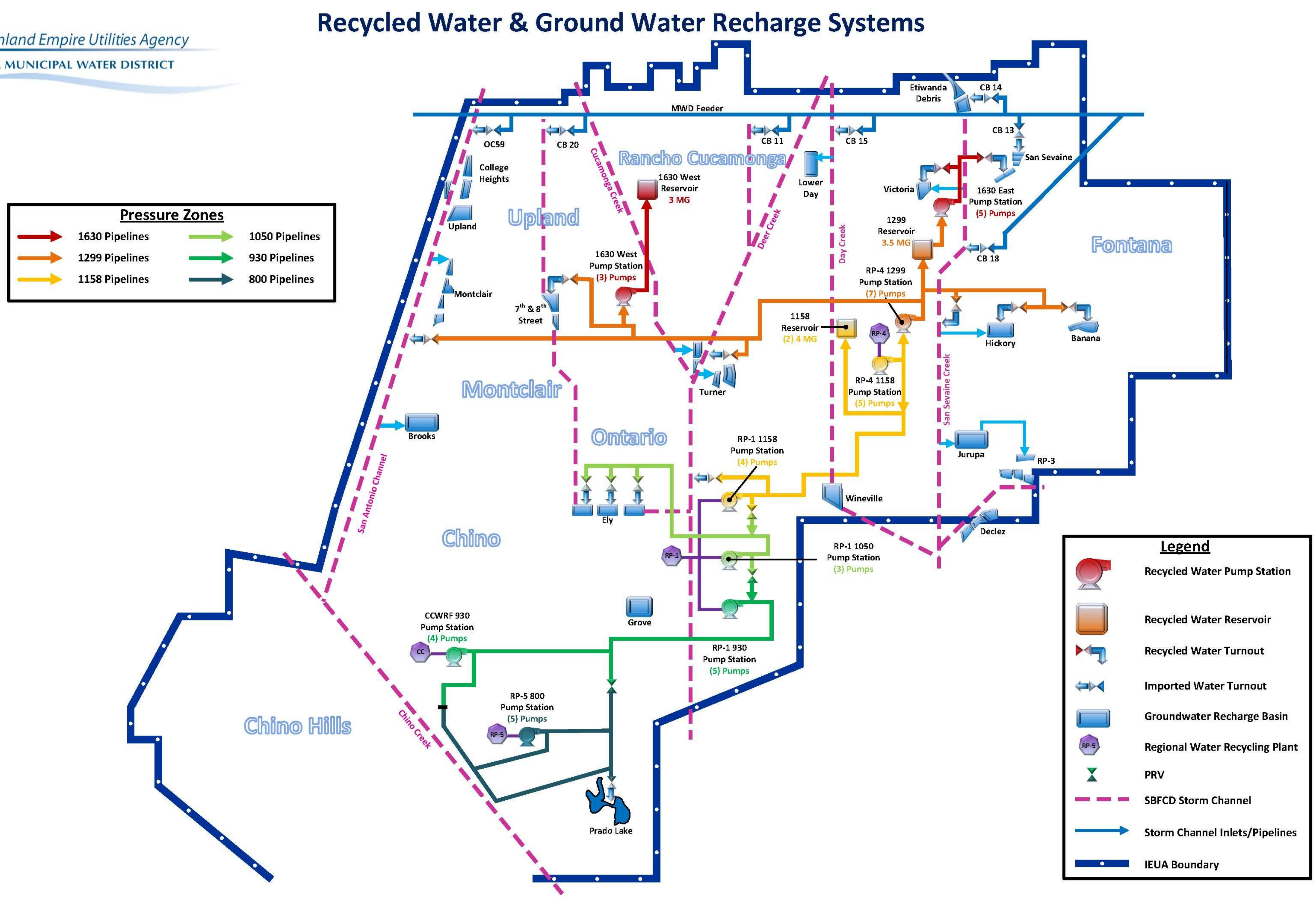

Figure 7-6: Recycled Water Distribution (RW) & Ground Water Recharge Systems (GWR) – Schematic

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Table 7-7: Recycled Water Distribution and Ground Water Recharge Systems – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	TBD	WC OE Projects	The project establishes an annual budget for applying the labor hours for project evaluation, design review, permit issuance, inspection, and closeout for office engineering projects related to recycled water connections and modifications.	WC	OM	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	500,000
2	EN06025	Wineville Extension Pipeline Segment A	A new 24" recycled water pipeline along Wineville Ave. from Airport Dr. to Jurupa St. continuing with a new 36" recycled water pipeline to RP-3 Groundwater Recharge Basin. The project includes a recycled water turnout to feed RP-3 Basin and a turnout to feed Declez Basin.	WC	CC	2,100,000	50,000	0	0	0	0	0	0	0	0	2,150,000
3	EN12016	North CIM Lateral	Construct recycled water lateral to the north side of CIM.	WC	CC	0	0	0	0	210,000	0	0	0	0	0	210,000
4	EN12019	GWR & RW SCADA Communication System Upgrades	This project will upgrade the SCADA communication system for all GWR and RW facilities.	WC	EQ	465,000	0	0	0	0	0	0	0	0	0	465,000
5	EN13001	San Sevaine Improvements	Project will modify the San Sevaine Basin Turnout to extend the discharge location from San Sevaine Cell No. 5 to the furthest north Cell No. 1.	WC	CC	3,500,000	3,000,000		0	0	0	0	0	0	0	6,500,000
6	EN13022	930 RW Reservoir		WC	CC	0	0	0	0	0	0	0	0	0	0	0
7	EN13023	930 Pressure Zone Pipeline	Approximately 18,000 LF of 30" pipeline connects the CCWRF System Pipeline to the new 930 Reservoir.	WC	CC	50,000	0	0	0	0	0	0	0	0	0	50,000
8	EN13041	RP-5 RW PS Process Control Sys Migration	Project to migrate the RP-5 RW PS to a Rockwell based system.	WC	CC	0	280,000	0	0	0	0	0	0	0	0	280,000
9	EN13045	Wineville Extension Pipeline Segment B	A new 24" recycled water pipeline along Wineville Ave. from Airport Dr. to Jurupa St. continuing with a new 36" recycled water pipeline to RP-3 Groundwater Recharge Basin. The project includes a recycled water turnout to feed RP-3 Basin and a turnout to feed Declez Basin.	WC	CC	1,600,000	50,000	0	0	0	0	0	0	0	0	1,650,000
10	EN13048	Second 12kV Feeder to TP-1	Potential Engineering project to provide a second 12kV feeder to TP-1 to support the RP-1 1158 PS Upgrades. RP-1 electrical PDR.	WC	CC	1,000,000	500,000	0	0	0	0	0	0	0	0	1,500,000

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
11	EN14042	RP-1 1158 Pump Station Improvements	Pump station improvements to increase capacity.	WC	CC	0	500,000	3,000,000	400,000	0	0	0	0	0	0	3,900,000
12	EN14043	800 Zone Capacity Implementation	Evaluation of additional recycled water pipeline leaving RP-5 to allow more recycled water to be delivered from this facility into the 800 Pressure Zone.	WC	CC	300,000	600,000	100,000	0	0	0	0	0	0	0	1,000,000
13	EN14044	RW Hydraulic Modeling for FY 14/15	RW Hydraulic Modeling	WC	OM	50,000	0	0	0	0	0	0	0	0	0	50,000
14	TBD	RW Hydraulic Modeling	Ongoing RW hydraulic modeling needs.	WC	OM	0	25,000	25,000	25,000	100,000	25,000	25,000	25,000	25,000	25,000	300,000
15	TBD	RW Program Strategy		WC	OM	0	0	0	0	250,000	0	0	0	0	250,000	500,000
16	EN15002	1158 Reservoir Site Cleanup Project	Cleanup associated with old piping and associated material.	WC	CC	0	500,000	0	0	0	0	0	0	0	0	500,000
17	EN15050	1630 W PS Improvements (Surge Protection & VFD Replacement)	Design and construction of a surge tank to dampen the surges in the 1299 Recycled water pipeline. Surge protection on the suction side of the 1630 Pump Station. Replace constant speed pumps with VFD.	WC	CC	400,000	650,000	350,000	0	0	0	0	0	0	0	1,400,000
18	EN19003	RP-1 Parallel Outfall Pipeline from RP-1 to Riverside Dr	This project will provide for a parallel pipeline following the TP-1 Out fall Pipeline from RP-1 to Edison Ave. to address the existing pipeline capacity issues.	WC	CC	0	1,000,000	2,000,000	2,000,000	0	0	0	0	0	0	5,000,000
19	RW15003	RMPU Soft Costs	Address the design for the RMPU	RW	OM/CC	820,000	1,600,000	1,200,000	0	0	0	0	0	0	0	3,620,000
20	RW15004	Lower Day RMPU Project	Address the design and construction of the lower day recharge master plan update	RW	CC	215,000	1,300,000	910,000	0	0	0	0	0	0	0	2,425,000
21	WR15019	RP-3 Basin Improvements	Groundwater Recharge Master Plan Update 2013 project #11. IEUA cost share= 50% total cost (committee approved 10/9/13; to board 10/16). Construction portion	WC	CC	0	0	650,000	2,650,000	0	0	0	0	0	0	3,300,000
22	WR15020	Victoria Basin Improvements	Groundwater Recharge Master Plan Update 2013 project #22a. IEUA cost share= 50% total cost (committee approved 10/9/13; to board 10/16). Construction portion.	WC	CC	0	0	65,000	65,000	0	0	0	0	0	0	130,000
23	WR15021	Napa Lateral/SB Speedway	Napa Lateral	WC	CC	200,000	1,000,000	2,800,000	2,000,000	0	0	0	0	0		6,000,000

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
24	TBD	Agencywide GWR Environmental Permits		RW	OM	25,000	0	0	0	0	0	0	0	0	0	25,000
25	TBD	Mag Channel Spillway Improvement	Address the required repairs and improvements. Spillway repair and sediment cleanup. ACOE Permit required.	RO	CC	350,000	0	0	0	0	0	0	0	0	0	350,000
26	TBD	RMPU Construction Costs	Construction cost for the remaining RMPU projects.	RW	CC	0	0	5,000,000	15,000,000	5,000,000	0	0	0	0	0	25,000,000
27	TBD	RP-1 Utility Water Flow Meter	Construct a flow meter w/bypass to measure internal recycled water at RP-1 from the 1050 pressure zone pipeline.	WC	CC	300,000	0	0	0	0	0	0	0	0	0	300,000
28	TBD	Ely Basin Turnout Remote Control Upgrades	Upgrade remote control capability at the Ely Basin turnout. Possible addition of monopole.	RW	CC	200,000	400,000	0	0	0	0	0	0	0	0	600,000
29	TBD	930 to 800 West CCWRF PRV	Construct a PRV to send water from the 930 pressure zone to the 800 pressure zone for CCWRF	WC	CC	0	100,000	500,000	0	0	0	0	0	0	0	600,000
30	TBD	1299 pressure zone pipeline surge tank	Install a surge tank on the 1299 pressure zone pipeline. To be located at the 1630 west pump station.	WC	CC	0	0	0	0	0	0	0	0	0	0	0
31	TBD	Energy Management system EMP	Install energy management system integrating though SCADA to monitor and optimize RW equipment	WC	CC	0	0	0	0	300,000	0	0	0	0	0	300,000
32	TBD	RW Pressure Sustaining Valve		WC	CC	350,000	500,000	0	0	0	0	0	0	0	0	850,000
33	TBD	Prado Basin Adaptive Management Plan Monitoring & Report		RW	OM	150,000	150,000	150,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	975,000
34	TBD	WC Planning Documents		WC	OM	500,000	500,000	0	0	0	0	0	0	0	0	1,000,000
35	TBD	RW Asset Management		RW	OM	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	1,250,000
36	TBD	RC Planning Documents	Planning efforts	RC	OM	1,000,000	1,000,000	0	0	0	0	0	0	0	0	2,000,000
37	TBD	WC Asset Management		WC	OM	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	2,500,000
38	TBD	RW Injection Pilot Study		WC	OM	200,000	300,000	0	0	0	0	0	0	0	0	500,000

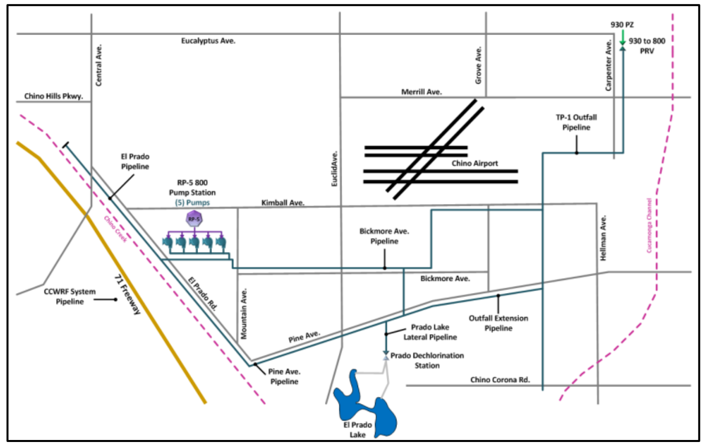
#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
39	TBD	WRCWRA	As defined by the PDR and the MOU with JCSD/WMWD	WC	OM	500,000	500,000	0	0	0						1,000,000
40	TBD	UWMP		WW	OM	500,000	500,000	0	0	0	0	0	0	0	0	1,000,000
41	TBD	Conservation Programing		WW	OM	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	3,000,000	30,000,000
42	TBD	WW Planning Documents		WW	OM	500,000	500,000	0	0	0	0	0	0	0	0	1,000,000
43	TBD	Drought Proofing Projects		WW	OM	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	25,000,000	250,000,000
44	TBD	RW AMP		WC	OM	0	0	0	0	0	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	25,000,000
45	TBD	Recycled Water Pump Station Emergency Generation Upgrade	Upgrade the emergency generators at the RW pump stations to meet load at high demand (RP-1 930 Pump Station, CCWRF 930 Pump Station, RP-1 1050 Pump Station, RP-4 1158 Pump Station, RP-1 1158 Pump Station, RP-4 1299 Pump Station)	WC	CC	0	0	0	0	0	0	2,000,000	2,000,000	2,000,000	0	6,000,000
46	TBD	Wineville Basin Pipeline	Construction of a pipeline to provide recycled water to Wineville Basin	WC	CC	0	0	0	0	0	0	0	0	100,000	900,000	1,000,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014
(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)
(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

Asset Management System Summary – RW/GWR

800 Pressure Zone

1. Asset Profile



RP-5 800 Pump Station

The RP-5 800 pump station provides recycled water to the 800 pressure zone for direct use by agricultural customers, the City of Chino, and San Bernardino County for feed water to El Prado Lake. The pump station is composed of five pumps:

- Two 150 hp vertical-turbine, VFD-driven, 1,925 gpm pumps
- Three 150 hp vertical-turbine, constant-speed, 1,925 gpm pumps

The RP5 800 pump station has two selectable automatic control philosophies:

- Wet Well Level Control – the pumps will be modulated to maintain an operator-adjustable wet-well level set point normally set at 14 feet.
- Pressure Control – the pumps will be modulated to maintain an operator-adjustable discharge-pressure set point normally set at 120 psi.

800 Pipelines

- *TP-1 Outfall Pipeline* – 15,700 linear feet (LF) of 30-inch pipeline from the 930 to 800 pressure reducing valve (PRV) to Chino Corona Rd.
- *Outfall Extension Pipeline* – 6,600 LF of 30-inch pipeline along Pine Ave. from the TP-1 outfall pipeline to the Prado Lake lateral, continuing with an additional 6,700 LF of 14-inch pipeline from the Prado Lake lateral to El Prado Golf Course.
- *Prado Lake Lateral Pipeline* – 535 LF of 30-inch pipeline from the outfall extension pipeline continuing with an additional 2,100 LF of 24-inch pipeline to the Prado Lake dechlorination station.
- *Pine Ave. Pipeline* – 2,200 LF of 16-inch pipeline from the El Prado Golf Course to RP-2.
- *El Prado Pipeline* – 12,800 LF of 10-inch pipeline from RP-2 to the Carbon Canyon Water Recycling Facility (CCWRF).
- *Bickmore Pipeline* – Consists of multiple pipeline segments including:
  - 5,500 LF of 18-inch pipeline along Kimball Ave. from the TP-1 outfall pipeline to Rincon Meadows Rd.
  - 5,600 LF of 18-inch pipeline along Rincon Meadows Rd. from Kimball Ave. to Bickmore Ave., continuing with an additional 1,550 LF of 12-inch pipeline from Bickmore Ave. to Pine Ave.
  - 6,300 LF of 30-inch pipeline along Bickmore Ave. from Rincon Meadows Rd. to San Antonio Ave.
  - 2,700 LF of 18-inch pipeline along Bickmore Ave. from San Antonio Ave. to Mountain Ave.
  - 2,500 LF of 18-inch pipeline from the intersection of Mountain Ave. and Bickmore Ave. to RP-5.
  - 1,000 LF of 10-inch pipeline from RP-5 to the El Prado pipeline.

Prado Dechlorination Station

The Prado dechlorination station provides dechlorinated recycled water to El Prado Lake. The station is composed of the following main components:

- A 12-inch flow-control sleeve valve with 14-inch magnetic flow meter and pressure transmitter.
- Two 5 gph sodium-bisulfite chemical metering pumps.
- Three 20 gph sodium-bisulfite chemical metering pumps.
- Two upstream chlorine analyzers.
- Two downstream chlorine analyzers biased to measure sodium bisulfite.

The flow control is automatically controlled to maintain either a flow control set point or an upstream pressure set point. The sodium-bisulfite chemical metering pumps are controlled to maintain a downstream sodium-bisulfite residual.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-5 800 Pumps	2 @ 1,925 gpm 3 @ 1,925 gpm	VFD Constant
TP-1 Outfall Pipeline	30-inch – 13,200 gpm	6.0 ft/s max velocity (mv)
Outfall Extension Pipeline	30-inch – 13,200 gpm 14-inch – 2,875 gpm	6.0 ft/s mv
Prado Lake Lateral Pipeline	30-inch – 13,200 gpm 24-inch – 8,500 gpm	6.0 ft/s mv
Pine Ave. Pipeline	16-inch – 3,755 gpm	6.0 ft/s mv
El Prado Pipeline	10-inch – 1,500 gpm	6.0 ft/s mv
Bickmore Pipeline	30-inch – 13,200 gpm 18-inch – 4,750 gpm 10-inch – 1,500 gpm	6.0 ft/s mv
Prado Sleeve Valve	300 – 14,000 gpm	
Prado DECH Station	2 @ 0.5 – 5 gph 3 @ 2 – 20 gph	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
RP-5 800 Pumps	1	3	3	2
TP-1 Outfall Pipeline	3	3	3	2
Outfall Extension Pipeline	3	3	3	3
Prado Lake Lateral Pipeline	2	3	3	3
Pine Ave. Pipeline	3	3	3	3
El Prado Pipeline	2	3	3	3
Bickmore Pipeline	1	4	5	2
Prado Sleeve Valve	1	2	2	1
Prado Dechlorination Station	4	2	4	1

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

RP-5 800 Pumps

No issues requiring immediate attention.

TP-1 Outfall Pipeline

No issues requiring immediate attention.

Outfall Extension Pipeline

No issues requiring immediate attention.

Prado Lake Lateral Pipeline

No issues requiring immediate attention.

Pine Ave. Pipeline

30" valve on west leg after lateral to old outfall and 14" valve on west side of lateral to Prado are out of service. Equipment should be replaced by the Maintenance Department.

El Prado Pipeline

No issues requiring immediate attention.

Bickmore Pipeline

At a maximum velocity of 6 ft/s, the 18-inch-diameter sections of the Bickmore pipeline have a capacity of 4,750 gpm. All recycled water supply from RP-5 is conveyed through the Bickmore pipeline; therefore, the current average daily RP-5 recycled water supply of 7,000 gpm exceeds the recommended capacity. In addition, when the RP-5 pump station is discharging 7,000 gpm, the discharge pressure at the pump station exceeds the pressure setting of the emergency pressure relief valve and discharges recycled water back into the RP-5 wet well. A potential project will address the system's issues. Project EN14043 will hydraulically model critical areas of the RW distribution system to prioritize capacity improvements.

The condition assessment concluded that the cathodic protection on this segment of pipeline was sufficient.

Prado Sleeve Valve

No issues requiring immediate attention.

Prado Dechlorination Station

Flow Meter is out of service and needs to be replaced. Equipment should be replaced by the Maintenance Department.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
RP-5 800 Pumps	2011	
TP-1 Outfall Pipeline	1976	
Outfall Extension Pipeline	1977	
Prado Lake Lateral Pipeline	1977	
Pine Ave. Pipeline	2004	
El Prado Pipeline	1993	
Bickmore Pipeline	2006	Complete - 2014
Prado Sleeve Valve	2011	
Prado Dechlorination Station	2011 1996	

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

Auxiliary Systems – 800 Pressure Zone

1. Asset Profile

RP-5 800 Pump Station

- *Electrical System – The electrical energy to power the RP-5 800 pump station is obtained from the RP-5 treatment facility, which receives power from the local electrical grid (SCE) and from onsite energy generation (solar, biogas internal combustion engines, and emergency generators). The solar assets are owned and operated by private firms as part of power purchase agreements. The biogas internal combustion engines are owned by the Agency, but leased to a private firm producing biogas at the RP-5 solids handling facility. The electrical feed from the grid is composed of two 12 kV feeders through the RP-5 treatment facility to Power Center 3, where transformers and switchgear are located to distribute electrical energy to the RP-5 800 pump station. A single line diagram of the RP-5 800 pump station electrical system is shown in Appendix B. Diesel emergency generators are used in the event of a power failure. Two 1.0 MW generators are located south of Power Center 3 and supply power to the RP-5 treatment facility including the RP-5 800 pump station.*
- *Instrumentation and Control System – An extensive array of instruments is used to monitor and control the processes for the RP-5 800 pump station. All the processes of the pump station are observed and controlled by the RP-5 treatment facility SCADA system. Local control wiring is fed from the individual pieces of equipment to MCCs and input/output (I/O) hubs in Power Center 3. The I/O hubs then transmit the control data by fiber optic cable to the Foxboro SCADA servers.*

Prado Dechlorination Station

- *Electrical System – The electrical energy to power the Prado dechlorination station is obtained from the local electrical grid (SCE). The electrical feed from the grid is composed of a 480 V feeder, a main power switch, and an automatic transfer switch before terminating in MCC-1. A single line diagram of the Prado dechlorination station electrical system is shown in Appendix B. A recently upgraded 27 kW Kohler diesel generator is located in the Prado sodium bisulfite pump room for use in a power failure.*
- *Utility Water System – The utility water system is supplied using recycled water from upstream of the sleeve valve and is used mainly for wash-down water in the pump and analyzer buildings. The piping consists of several isolation valves and point-of-use connections.*
- *Potable Water System – The potable water system is used throughout the Prado dechlorination station for restrooms, sinks, and eye-wash stations. The system is supplied from a service on Johnson Ave. from the City of Chino. The utility water system is supplied using recycled water from upstream of the sleeve valve and is used mainly for wash-down water in the pump and analyzer buildings. The piping consists of several isolation valves and point-of-use connections.*
- *Instrumentation and Control System – An extensive array of instruments is used to monitor and control the processes for the Prado dechlorination station. All the processes of the dechlorination station are observed and controlled by the local programmable logic controller (PLC) system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and local PLC located in Control Panel 3300. Control data is then sent to RP-5 and RP-1 through a radio transmitter for remote access to the control system.*

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-5 800 Pump Station		
Electrical System		
Utility Voltage	12 kV	2 Feeders
Transformers	2 @ 12 kV to 480 V	
Switchgear	1 @ 480 V	
Distribution	2 @ 480 V	MCCs
Generator	2 @ 1,100 kW 1,490 Bhp	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	N/A	
I/O Hub	3 units	
Radio Transmitter	1 unit	RP-5
Prado Dechlorination Station		
Electrical System		
Utility Voltage	480 V	2 Feeders
Transformers	NA	
Switchgear	1 @ 480 V	ATS
Distribution	1 @ 480 V	MCCs
Generator	1 @ 27 kW 36 Bhp	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	1 unit	CP 3300
I/O Hub	1 unit	CP 3300
Radio Transmitter	1 unit	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
RP-5 800 Pump Station				
Electrical System	1	2	2	2
Instrumentation and Control System	2	3	2	3
Prado Dechlorination Station				
Electrical System	3	3	3	3
Utility Water System	3	3	3	3
Potable Water System	3	3	3	3
Instrumentation and Control System	2	1	2	1

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

RP-5 800 Pump Station:
No issues requiring immediate attention.

Prado Dechlorination Station:
No issues requiring immediate attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
RP-5 800 Pump Station		
Electrical System	2004 2010	
Instrumentation and Control System	2004 2010	
Prado Dechlorination Station		
Electrical System	1990	
Utility Water System	1990	
Potable Water System	1990	
Instrumentation and Control System	1990 2011	

Table 4 Potential Projects

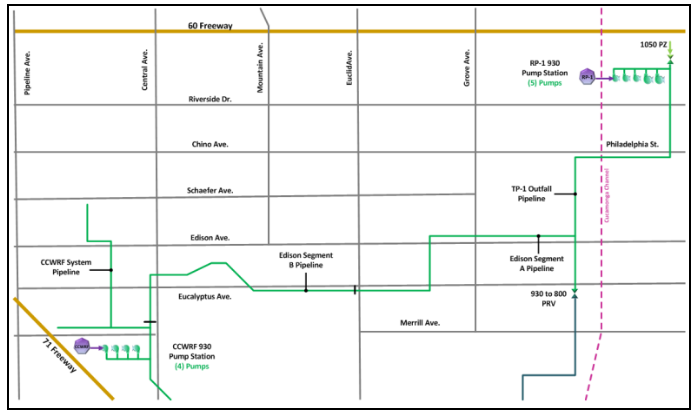
System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

930 Pressure Zone

1. Asset Profile



RP-1 930 Pump Station
The RP-1 930 pump station provides recycled water to the 930 pressure zone for direct use by agricultural customers, the City of Chino, and the City of Chino Hills. The pump station is composed of five pumps:

- Three 150 hp vertical-turbine, VFD-driven, 2,790 gpm pumps
- Two 500 hp vertical-turbine, VFD-driven, 9,330 gpm pumps

The RP-1 930 pump station is automatically controlled to maintain a discharge-pressure set point of about 55 psi.

CCWRF 930 Pump Station
The CCWRF 930 pump station provides recycled water to the 930 pressure zone for direct use by agricultural customers, the City of Chino, and the City of Chino Hills. The pump station is composed of (2) 300 hp vertical-turbine, VFD-driven, 2,585 gpm pumps, and (3) 300 hp vertical turbine, constant, 2,585 gpm pumps. The CCWRF 930 pump station is automatically controlled to cycle pumps on and off based on level set points of the RP-1 recycled water wet well.

930 Pipelines

- *CCWRF System Pipeline* – 2,300 LF of 30-inch pipeline from CCWRF to the intersection of Monte Vista Ave. and Chino Hills Parkway, continuing with an additional 5,200 LF of 20-inch pipeline along Monte Vista Ave. between Chino Hills Parkway and Edison Ave.
- *Edison Segment A Pipeline* – 18,500 LF of 30-inch pipeline from the intersection of Chino Hills Parkway and Telephone Ave. to the intersection of Euclid Ave. and Eucalyptus Ave.
- *Edison Segment B Pipeline* – 15,900 LF of 30-inch from the intersection of Euclid Ave. and Eucalyptus Ave. to the TP-1 outfall pipeline.
- *TP-1 Outfall Pipeline* – 12,800 LF of 30-inch pipeline from RP-1 to the 930 to 800 pressure reducing valve (PRV).

930 to 800 Pressure Reducing Valve (PRV)
The 930 to 800 PRV is located at the intersection of Eucalyptus Ave. and Carpenter Ave. and is used to maintain the downstream pressure in the 800 pressure zone. The system includes a 16-inch Cla-Val PRV, flow meter, and pressure transmitter. The system has a design flow range of 200 gpm to 14,000 gpm.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-1 930 Pumps	3 @ 2,790 gpm 2 @ 9,330 gpm	VFD VFD
CCWRF 930 Pumps	2 @ 2,585 gpm 3 @ 2,585 gpm	VFD Constant
CCWRF System Pipeline	30 -inch – 13,200 gpm 20-inch – 5,900 gpm	6.0 ft/s max velocity(mv)
Edison Segment A Pipeline	30-inch – 13,200 gpm	6.0 ft/s mv
Edison Segment B Pipeline	30-inch – 13,200 gpm	6.0 ft/s mv
TP-1 Outfall Pipeline	30-inch – 13,200 gpm	6.0 ft/s mv
930 to 800 PRV	200 – 14,000 gpm	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
RP-1 930 Pumps	2	3	2	3
CCWRF 930 Pumps	1	2	2	3
CCWRF System Pipeline	3	3	4	3
Edison Segment A Pipeline	2	3	3	1
Edison Segment B Pipeline	2	3	3	1
TP-1 Outfall Pipeline	4	5	4	1
930 to 800 PRV	1	3	2	1

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

RP-1 930 Pumps
No issues requiring immediate attention

CCWRF 930 Pumps
No issues requiring immediate attention

CCWRF System Pipeline
Flexibility is needed to supply recycled water from the 930-foot pressure zone to the 800-foot pressure zone. In addition, allow CCWRF 930 pumps to distribute more recycled water. A potential project will construct a PRV to address this issue.

Condition assessment performed in 2014 identified that the pipeline was not installed with either a corrosion monitoring or cathodic protection system. Therefore, the condition of the pipeline is unknown at this time. A potential project is needed to address this issue.

Edison Segment A Pipeline
No issues requiring immediate attention.

Condition assessment performed in 2014 identified that the pipeline is electrically shorted to a bare metallic casing installed below the stormwater channel and is unlikely to be receiving any cathodic protection. In addition, the pipeline is not electrically isolated at the point of connection with CCWRF System Pipeline or Edison Segment B Pipeline, which link both cathodic protection systems. A potential project is needed to address these issues.

Edison Segment B Pipeline
There is no valve at Eucalyptus Ave. and Central Ave to isolate the west side of the system.

Condition assessment performed in 2014 identified that there is no cathodic protection taking place on the pipeline and the inspection locations have been paved over. A potential project is needed to address these issues.

TP-1 Outfall Pipeline
During high recycled-water-demand periods, it has been common to flow more than 18,000 gpm through this pipeline to maintain system pressures. This equates to a flow velocity of more than 8 ft/s, which is not recommended for long-term operation. Because of the age of the pipeline and the operational requirements placed on the pipeline, condition assessment should be performed. A condition assessment should be scheduled in 2015 to assess any potential project requirements.

930 to 800 PRV
No issues requiring immediate attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
RP-1 930 Pumps	2007 2012	
CCWRF 930 Pumps	2000	
CCWRF System Pipeline	2000	2014 Report
Edison Segment A Pipeline	2006	2014 Report
Edison Segment B Pipeline	2006	2014 Report
TP-1 Outfall Pipeline	1976	Scheduled 2015
930 to 800 PRV	2007 2013	

Table 4 Potential Projects

System	Project Name	Project Description
CCWRF System Pipeline	930 to 800 West CCWRF PRV	Construct a PRV to send water from the 930 pressure zone to the 800 pressure zone for CCWRF
CCWRF System Pipeline	930 Pressure Zone Pipeline Cathodic Protection	Install cathodic protection on the CCWRF RW pipeline and Edison Segment B pipeline, and repair cathodic protection on Edison Segment A Pipeline.

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

Auxiliary Systems – 930 Pressure Zone

1. Asset Profile

RP-1 930 Pump Station

- *Electrical System – The electrical energy to power the RP-1 930 pump station is obtained from the RP-1 treatment facility, which receives power from the local electrical grid (SCE) and from onsite energy generation (solar, fuel cell, and emergency generators). The solar and fuel cell assets are owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the RP-1 power reliability building (PRB), where transformers and switchgear are located to distribute electrical energy throughout the facility. TP-1 and the RP-1 930 pump station are powered through the H9 breaker. A single line diagram of the RP-1 930 pump station electrical system is shown in Appendix B. The RP-1 treatment facility has three 1.25 MW diesel generators located in the PRB, and TP-1 has one 670 kW diesel generator; however, these generators were not designed to maintain operation of the recycled water pump stations during a power failure.*
- *Instrumentation and Control System – An extensive array of instruments is used to monitor and control the processes for the RP-1 930 pump station. All the processes of the pump station are observed and controlled by a local PLC system. Local control wiring is fed from the individual pieces of equipment to I/O hub and PLC in the RP-1 930 pump station electrical room. Fiber optic cable is then used to connect the local PLC to the RP-1 server workstation for remote access and transition of control data into the RP-1 SCADA system.*

CCWRF 930 Pump Station

- *Electrical System – The electrical energy to power the CCWRF 930 pump station is obtained from the CCWRF treatment facility, which receives power from the local electrical grid (SCE) and from onsite energy generation (solar and emergency generators). The solar assets are owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the CCWRF electrical room, where transformers and switchgear are located to distribute electrical energy throughout the facility. A single line diagram of the CCWRF 930 pump station electrical system is shown in Appendix B. The CCWRF treatment facility has one 1.50 MW diesel generator located in the main electrical room; however, this generator was not designed to maintain operation of the recycled water pump station during a power failure.*
- *Instrumentation and Control System – An extensive array of instruments is used to monitor and control the processes for the CCWRF 930 pump station. All the processes of the pump station are observed and controlled by a local PLC system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the CCWRF recycled-water pump-station control room. Fiber optic cable is then used to connect the local PLC to the CCWRF radio transmitter to send the signal to the new recycled-water master server located at RP-1.*

930 to 800 Pressure Reducing Valve (PRV)

- *Electrical System – The electrical energy to power the 930 to 800 PRV station is obtained from onsite energy generation located in the PRV and stored in onsite 12 V batteries. There is no electrical feed from the grid. A single line diagram of the 930 to 800 PRV station electrical system is shown in Appendix B. There is no emergency generation for this site.*
- *Instrumentation and Control System – Control of the PRV is maintained hydraulically and does not require an automated control system. System flow and pressure are monitored at the 930 to 800 PRV. Local wiring is fed from the individual pieces of equipment to a local PLC. The PLC is connected to a remote telemetry unit, which transmits the signals back to RP-1 over a 4G data network to the GWR PLC.*

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-1 930 Pump Station		
Electrical System		
Utility Voltage	12 kV	2 Feeders
Transformers	2 @ 12 kV to 480 V	
Switchgear	1 @ 480 V	
Distribution	1 @ 480 V	MCCs
Generator	N/A	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	1 unit	
I/O Hub	1 unit	
Radio Transmitter	1 unit	
		RP-1
CCWRF 930 Pump Station		
Electrical System		
Utility Voltage	12 kV	
Transformers	1 @ 12 kV to 480 V	
Switchgear	N/A	
Distribution	1 @ 480 V	MCCs
Generator	N/A	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	1 unit	LCP 1200
I/O Hub	1 unit	LCP 1200
Radio Transmitter	1 unit	CCWRF
930 to 800 PRV Station		
Electrical System		
Utility Voltage	12 V DC	Onsite Generation
Transformers	N/A	
Switchgear	N/A	
Distribution	N/A	
Generator		
Instrumentation and Control System	N/A	
HMI Workstation		
RTU		
PLC	N/A	
I/O Hub	1 unit	4G
Radio Transmitter	1 unit	
	N/A	
	N/A	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
RP-1 930 Pump Station				
Electrical System	3	3	3	4
Instrumentation and Control System	3	3	3	3
CCWRF 930 Pump Station				
Electrical System	3	3	3	4
Instrumentation and Control System	3	3	3	3
930 to 800 PRV Station				
Electrical System	1	3	3	3
Instrumentation and Control System	1	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

RP-1 930 Pump Station:

- **Electrical System**
  RP-1 has three emergency diesel generators, and TP-1 has one emergency diesel generator to produce an effective electrical load of 3.5 MW. RP-1 has a varying electrical demand, ranging from 3.0 MW to as high as 4.8 MW depending on the amount of recycled water pumped. Therefore, RP-1 typically does not have the emergency generation capability to power the three recycled water pump stations located at the facility. The Agency would not be able to maintain the operation of the recycled water system if a sustained loss of utility power were to occur. A potential project is needed to address the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.
  No issues require specific attention.

CCWRF 930 Pump Station:

- **Electrical System**
  CCWRF has one emergency diesel generator rated to produce an electrical load of 1.5 MW. CCWRF has a base electrical demand, without recycled water pumping, ranging from 600 kW to 800 kW. The expansion of the CCWRF recycled water pump station will provide five 300 hp pumps for a total power demand of about 1,100 kW. Therefore, the CCWRF emergency diesel generator will not be able to provide the required electrical load for CCWRF and the maximum production of the recycled water pump station. A potential project is needed to address the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.

930 to 800 PRV Station:
No issues requiring immediate attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
RP-1 930 Pump Station		
Electrical System	2007	
Instrumentation and Control System	2007 2012	
CCWRF 930 Pump Station		
Electrical System	2000 2014	
Instrumentation and Control System	2000 2014	
930 to 800 PRV Station		
Electrical System	2013	
Instrumentation and Control System	2013	

Table 4 Potential Projects

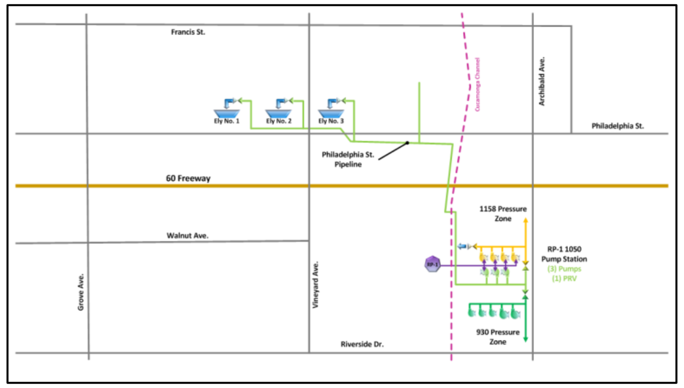
System	Project Name	Project Description
RP-1 930 Pump Station Electrical System	Recycled Water Pump Station Emergency Generation Upgrade	Upgrade the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.
CCWRF 930 Pump Station Electrical System	Recycled Water Pump Station Emergency Generation Upgrade	Upgrade the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

1050 Pressure Zone

1. Asset Profile



RP-1 1050 Pump Station
The RP-1 1050 pump station provides recycled water to the RP-1 utility water system, the 1050 pressure zone for direct use by the City of Ontario, and to Ely Basin for groundwater recharge. The pump station is composed of three 350 hp vertical-turbine pumps, VFD-driven, 3,750 gpm pumps. The 1050 pump station is automatically controlled to maintain a discharge-pressure set point of about 115 psi.

1050 Pipelines
Philadelphia Street Pipeline – 2,650 LF of 30-inch pipeline from the 1050 pump station to the 60 freeway, continuing with an additional 6,950 LF of 24-inch pipeline to Ely Basin No. 1.

1050 to 930 Pressure Reducing Valve (PRV)
The 1050 to 930 PRV is located at RP-1 and is used to transfer excess recycled water from the 1050 pressure zone to the 930 pressure zone when low pressures are experienced in the 930 pressure zone. The system includes a 24-inch Cla-Val PRV and 24-inch magnetic flow meter. The system has an operating flow range from 700 gpm to 20,000 gpm.

Ely Basin Turnouts
This system is composed of three separate turnouts, each including a 12-inch Cla-Val flow control valve, a flow meter, and a pressure transmitter to provide recycled water to Ely Basin Nos. 1, 2, and 3. Each turnout is designed for flow rates ranging from 700 gpm to 3,100 gpm.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-1 1050 Pumps	3 @ 3,750 gpm	VFD
Philadelphia St. Pipeline	30-inch – 13,200 gpm 24-inch – 8,500 gpm	6.0 ft/s mv
1050 to 930 PRV	700 – 20,000 gpm	
Ely Basin Turnouts	3 @ 700 – 3,100 gpm	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
RP-1 1050 Pumps	3	3	3	4
Philadelphia St. Pipeline	2	2	2	1
1050 to 930 PRV	2	3	2	2
Ely Basin Turnouts	3	3	4	4

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

RP-1 1050 Pumps
The VFD manufacturer no longer supports this equipment. A potential project is needed to address the system's issue.

Philadelphia St. Pipeline
The utility water for RP-1 is supplied by the RP-1 1050 pumps, but the usage cannot be directly measured because there is no flow meter. A potential project will address this issue.

Condition assessment performed in 2014 identified that the cathodic protection was functioning properly and the pipeline was installed in soil with "Negligible Corrosivity."

1050 to 930 PRV
No issues requiring special attention.

Ely Basin Turnouts
Remote control of the Ely basin turnouts have been lost, preventing shutdown of recycled water to these basins during low-supply events. Currently, the valves have to be opened and closed locally in the field. Valves need to be repaired to allow remote operation. A potential project is needed to address the system issues.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
RP-1 1050 Pumps	2004	
Philadelphia St. Pipeline	2005	2014 Report
1050 to 930 PRV	2011	
Ely Basin Turnouts	2005	

Table 4 Potential Projects

System	Project Name	Project Description
RP1 1050 Pumps	RW VFD Replacement	This project will replace the obsolete VFDs that are no longer supported by the manufacturer at the pump station
Philadelphia St. Pipeline	RP-1 Utility Water Flow Meter	Construct a flow meter w/bypass to measure internal recycled water at RP-1 from the 1050 pressure zone pipeline.
Ely Basin Turnouts	Ely Basin Turnout Remote Control Upgrades	Upgrade remote control capability at the turnout.

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

Auxiliary Systems – 1050 Pressure Zone

1. Asset Profile

RP-1 1050 Pump Station

- *Electrical System – The electrical energy to power the RP-1 1050 pump station is obtained from the RP-1 treatment facility, which receives power from the local electrical grid (SCE) and from onsite energy generation (solar, fuel cell, and emergency generators). The solar and fuel cell assets are owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the RP-1 power reliability building (PRB), where transformers and switchgear are located to distribute electrical energy throughout the facility. TP-1 and the RP-1 1050 pump station are powered through the H9 breaker. A single line diagram of the RP-1 1050 pump station electrical system is shown in Appendix B. The RP-1 treatment facility has three 1.25 MW diesel generators located in the PRB, and TP-1 has one 670 kW diesel generator; however, these generators were not designed to maintain operation of the recycled water pump stations during a power failure.*
- *Instrumentation and Control System – An extensive array of instruments is used to monitor and control the processes for the RP-1 1050 pump station. All the processes of the pump station are observed and controlled by a local PLC system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the RP-1 1158 and 1050 pump station electrical room. Fiber optic cable is then used to connect the local PLC to the RP-1 server workstation for remote access and transition of control data into the RP-1 SCADA system.*

1050 to 930 PRV

- *Electrical System – The electrical energy to power the 1050 to 930 PRV is looped powered through the RP-1 1158 and 1050 pump station PLC. A single line diagram of the 1050 to 930 PRV electrical system is shown in Appendix B. Since the power draw to operate this system is negligible, the 670 kW TP-1 diesel generator will power the 1158 and 1050 pump station PLC during a power failure.*
- *Instrumentation and Control System – The 1050 to 930 PRV consists of a 24-inch Cla-Val PRV with position indication and control and a 24-inch flow meter. All of the processes of the PRV are observed and controlled by the 1158 and 1050 pump station PLC system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the 1158 and 1050 pump station electrical room. Fiber optic cable is then used to connect the local PLC to the RP-1 server workstation for remote access and transition of control data into the RP-1 SCADA system.*

Ely Basin Turnouts

- *Electrical System – The electrical energy to power the three Ely Basin recycled water turnouts is provided by three independent solar panels. A single line diagram of the Ely basin turnouts is shown in Appendix B. The turnouts do not have emergency power generation in case of power failure.*
- *Instrumentation and Control System – Each of the three Ely Basin recycled water turnouts has a 10dB yagi antenna that transmits control data to a PLC located at Ely Basin No. 1. The PLC at Ely Basin No. 1 then transmits control data back to the GWR workstation server located at RP-1 for remote access.*

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2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-1 1050 Pump Station Electrical System Utility Voltage Transformers Switchgear Distribution Generator Instrumentation and Control System HMI Workstation RTU PLC I/O Hub Radio Transmitter	12 kV 2 @ 12 kV to 480 V 2 @ 480 V 1 @ 480 V N/A 1 unit N/A 1 unit 1 unit 1 unit	MCCs RP-1
1050 to 930 PRV Electrical System Utility Voltage Transformers Switchgear Distribution Generator Instrumentation and Control System HMI Workstation RTU PLC I/O Hub Radio Transmitter	120 V N/A N/A N/A 1 @ 670 kW 896 Bhp 1 unit N/A 1 unit 1 unit 1 unit	PLC Loop TP-1 RP-1
Ely Basin Turnouts Electrical System Utility Voltage Transformers Switchgear Distribution Generator Instrumentation and Control System HMI Workstation RTU PLC I/O Hub Radio Transmitter	24 VDC N/A N/A N/A N/A N/A 1 unit 1 unit 1 unit 4 units	Solar

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
RP-1 1050 Pump Station				
Electrical System	3	3	3	4
Instrumentation and Control System	3	3	3	3
1050 to 930 PRV				
Electrical System	2	3	3	3
Instrumentation and Control System	3	3	3	3
Ely Basin Turnouts				
Electrical System	3	4	3	3
Instrumentation and Control System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

RP-1 1050 Pump Station:

- **Electrical System**
  RP-1 has three emergency diesel generators, and TP-1 has one emergency diesel generator to produce an effective electrical load of 3.5 MW. RP-1 has a varying electrical demand ranging from 3.0 MW to as high as 4.8 MW, depending on the amount of recycled water pumped. Therefore, RP-1 typically does not have the emergency generation capability to power the three recycled water pump stations located at the facility. Normally, the 1050 pump station supplies utility water for RP-1. Utility water is critical to maintain operation of the facility. A potential project is needed to address the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.

1050 to 930 PRV Station:
No issues requiring immediate attention

Ely Basin Turnout:
No issues requiring immediate attention

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
RP-1 1050 Pump Station		
Electrical System	2004	
Instrumentation and Control System	2004 2008	
1050 to 930 PRV		
Electrical System	2011	
Instrumentation and Control System	2011	
Ely Basin Turnouts		
Electrical System	2005	
Instrumentation and Control System	2005	

Table 4 Potential Projects

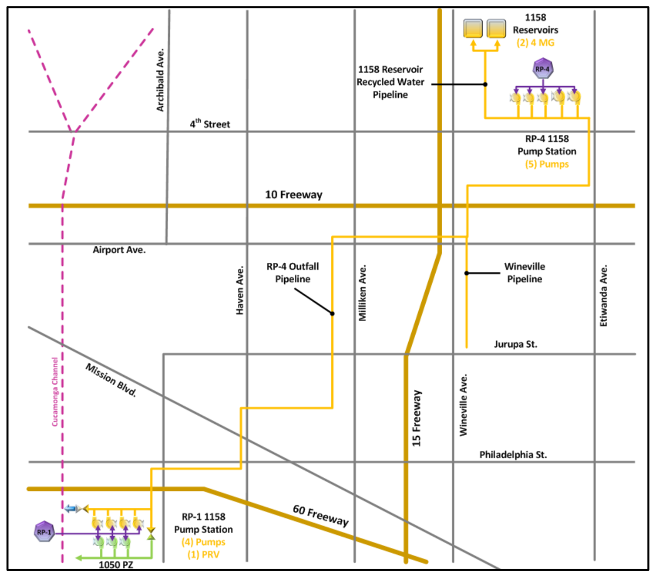
System	Project Name	Project Description
RP-1 1050 Pump Station Electrical System	Recycled Water Pump Station Emergency Generation Upgrade	Upgrade the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

1158 Pressure Zone

1. Asset Profile



1158 Reservoirs
The 1158 reservoirs provide recycled water supply to the 1299 pump station suction header and the 1158 pressure zone. The 1158 reservoirs are located at the intersection of Etiwanda Ave. and 6th St. in the City of Rancho Cucamonga within the GenON Power Generation Facility. Each 1158 reservoir has a design capacity of 4 million gallons (MG), a diameter of 145 feet, and a maximum water surface level of 34 feet, and each is equipped with a level transmitter, flow meter, and altitude valve. The 1158 reservoirs are normally operated between 4 feet and 32 feet, providing an operational capacity of 3.5 MG.

RP-4 1158 Pump Station
The RP-4 1158 pump station provides recycled water to the 1299 pump station suction header, to 1158 reservoirs, and to the 1158 pressure zone for direct use by the City of Fontana and the City of Ontario. The pump station is composed of five pumps:

- Three 200 hp vertical-turbine, VFD-driven, 2,500 gpm pumps
- Two 300 hp vertical-turbine, VFD-driven, 7,200 gpm pumps

The RP-4 1158 pump station is automatically controlled to maintain the level in the RP-4 effluent wet well structure.

RP-1 1158 Pump Station
The RP-1 1158 pump station provides recycled water to the 1299 pump station suction header, to 1158 reservoirs, and to the 1158 pressure zone for direct use by the City of Fontana and the City of Ontario. The pump station is composed of four 400 hp vertical-turbine, VFD-driven, 2,700 gpm pumps.

The RP-1 1158 pump station is automatically controlled to cycle pumps on and off to maintain a time-of-day level set point of the 1158 reservoirs. In addition, the pumps can automatically be switched to VFD control to maintain the RP-1 effluent wet well level when a low level setting is reached.

1158 Pipelines

- *RP-4 Outfall Pipeline* – 25,200 LF of 42-inch pipeline from RP-4 to the intersection of DuPont Ave. and Jurupa St., 15,000 LF of 36-inch pipeline from DuPont Ave. and Jurupa St. to the intersection of Archibald Ave. and Philadelphia Ave., and 4,200 LF of 42-inch pipeline from Archibald Ave. and Philadelphia Ave. to RP-1.
- *1158 Reservoir Pipeline* – 4,200 LF of 48-inch pipeline from RP-4 to the 1158 Reservoirs.
- *Wineville Pipeline* – 5,400 LF of 24-inch pipeline along Wineville Ave. from Airport Dr. to Jurupa St.

1158 to 1050 Pressure Reducing Valve (PRV)
The 1158 to 1050 PRV is located at RP-1 and used to transfer excess recycled water from the 1158 pressure zone to the 1050 pressure zone when the 1158 reservoirs reach a high level set point. The system includes a 16-inch Cla-Val PRV and 24-inch magnetic flow meter. The system has an operating flow range from 300 gpm to 17,000 gpm.

RP-4 Energy Displacement Valves (EDV)
The RP-4 EDVs are located at RP-1 and used to discharge excess recycled water when the 1158 reservoirs reach a high level set point. The excess recycled water is treated through the RP-1 north dechlorination structure before being discharged to the Cucamonga Channel. The turnout includes two 16-inch motor-operated globe-style EDVs, flow meter, and bypass pipeline. Each EDV has an operating flow range from 500 gpm to 11,000 gpm.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
1158 Reservoirs	2 @ 4 MG	3.5 MG (Op. Cap.)
RP-4 1158 Pumps	3 @ 2,500 gpm 2 @ 7,200 gpm	VFD VFD
RP-1 1158 Pumps	4 @ 2,700 gpm	VFD
RP-4 Outfall Pipeline	42-inch – 25,900 gpm 36-inch – 19,000 gpm	6.0 ft/s mv
1158 Reservoir Pipeline	33,800 gpm	6.0 ft/s mv
Wineville Pipeline	8,500 gpm	6.0 ft/s mv
1158 to 1050 PRV	300 – 17,000 gpm	
RP-4 EDVs	2 @ 500–11,000 gpm	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
1158 Reservoirs	1	3	3	1
RP-4 1158 Pumps	3	3	3	4
RP-1 1158 Pumps	3	3	3	4
RP-4 Outfall Pipeline	3	3	3	4
1158 Reservoir Pipeline	2	2	2	2
Wineville Pipeline	2	3	3	2
1158 to 1050 PRV	2	2	2	3
RP-4 EDVs	3	2	2	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

1158 Reservoirs
No issues requiring immediate attention.

A condition assessment was performed in August 2014. It is recommended that the annual monitoring testing is performed at the reservoirs highest operating level. It is also recommended that the mechanical connection between the copper cable pigtails and the reservoirs be removed; should only be connected through the solid state decouplers. Maintenance will address removing the connection.

RP-4 1158 Pumps
No issues requiring immediate attention.

RP-1 1158 Pumps
The VFD manufacturer no longer supports this equipment. A potential project is needed to address the system's issue.

RP-4 Outfall Pipeline
In 2004, the RP-4 outfall pipeline was converted from a gravity pipeline to a pressure pipeline to create the 1270 recycled water pressure zone. Pressure at RP-1 was normally in excess of 200 psi, which is within the pressure class of the pipeline; however, multiple joint failures of the 42-inch pipeline have occurred, requiring emergency repairs to the system. In late 2008, the pipeline was converted to the 1158 recycled water pressure zone. A condition assessment may be warranted as a result of the number of pipeline failures. A condition assessment should be scheduled in 2015 to assess any potential project requirements.

1158 Reservoir Pipeline
A condition assessment in 2014 identified that one of the three test stations functioning and there was uncertainty determining if there were any signs of corrosion. It was also identified that soil is "Negligible Corrosivity." A potential project is needed to repair these issues.

Wineville Pipeline
No issues requiring immediate attention.

1158 to 1050 PRV
No issues requiring immediate attention.

RP-4 EDVs
No issues requiring immediate attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
1158 Reservoirs	2008	2014 Report
RP-4 1158 Pumps	2004 2008	
RP-1 1158 Pumps	2004 2006 2008	
RP-4 Outfall Pipeline	1998	Schedule for 2015
1158 Reservoir Pipeline	2004	2014 Report
Wineville Pipeline	2004	
1158 to 1050 PRV	2011	
RP-4 EDVs	1998 2005	

Table 4 Potential Projects

System	Project Name	Project Description
RP1 1158 Pumps	RW VFD Replacement	This project will replace the obsolete VFDs that are no longer supported by the manufacturer at the pump station
1158 Reservoir Pipeline	1158 Reservoir Pipeline Cathodic Protection	Repair 1158 reservoir pipeline cathodic protection test stations.

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR
Auxiliary Systems – 1158 Pressure Zone
1. Asset Profile

RP-4 1158 Pump Station

- *Electrical System – The electrical energy to power the RP-4 1158 pump station is obtained from the local electrical grid (SCE) and from onsite energy generation (wind and emergency generators). The solar and wind assets are owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the power panel switch gear, where transformers and switchgear are located to distribute electrical energy throughout the facility. A single line diagram of the RP-4 electrical system is shown in Appendix B. The RP-4 treatment facility has one 2.0 MW diesel generator located in the northern portion of the facility; however, the generator was not designed to maintain operation of the recycled water pump stations during a power failure.*
- *Instrumentation and Control System – An extensive array of instruments is used to monitor and control the processes for the RP-4 1158 pump station. All the processes of the pump station are observed and controlled by a local PLC system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the RP-4 1158 pump station electrical room. Fiber optic cable is then used to connect the local PLC to the RP-4 server workstation for remote access.*

RP-1 1158 Pump Station

- *Electrical System – The electrical energy to power the RP-1 1158 pump station is obtained from the RP-1 treatment facility, which receives power from the local electrical grid (SCE) and from onsite energy generation (solar, fuel cell, and emergency generators). The solar and fuel cell assets are owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the RP-1 power reliability building (PRB), where transformers and switchgear are located to distribute electrical energy throughout the facility. TP-1 and the RP-1 1158 pump station are powered through the H9 breaker. A single line diagram of the RP-1 1158 pump station electrical system is shown in Appendix B. The RP-1 treatment facility has three 1.25 MW diesel generators located in the PRB, and TP-1 has one 670 kW diesel generator; however, these generators were not designed to maintain operation of the recycled water pump stations during a power failure.*
- *Instrumentation and Control System – An extensive array of instruments is used to monitor and control the processes for the RP-1 1158 pump station. All the processes of the pump station are observed and controlled by a local PLC system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the 1158 and 1050 pump station electrical room. Fiber optic cable is then used to connect the local PLC to the RP-1 server workstation for remote access and transition of control data into the RP-1 SCADA system.*

1158 Reservoirs

- *Electrical System – The electrical energy to power the 1158 reservoirs is obtained from the local electrical grid (SCE), which is composed of a 120 V feeder to a local control panel on 6th Street. A single line diagram of the RP-1 1158 pump station electrical system is shown in Appendix B. The 1158 reservoirs do not have emergency power generation in case of power failure.*
- *Instrumentation and Control System – Level, flow, and valve position are monitored at the 1158 reservoirs. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the 1158 reservoir local control panel. Fiber optic cable is then used to connect the local PLC to the RP-4 server workstation for remote access.*

1158 to 1050 PRV

- *Electrical System – The electrical energy to power the 1158 to 1050 PRV is looped powered through the 1158 and 1050 pump station PLC. A single line diagram of the 1158 to 1050 PRV electrical system is shown in Appendix B. The 670 kW TP-1 diesel generator will power the 1158 pump station and 1050 pump station PLC during a power failure, since the power draw to operate this system is negligible.*
- *Instrumentation and Control System – The 1158 to 1050 PRV consists of a 16-inch Cla-Val PRV with position indication and control and a 24-inch flow meter. All of the processes of the PRV are observed and controlled by the 1158 and 1050 pump station PLC system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the 1158 and 1050 pump station electrical room. Fiber optic cable is then used to connect the local PLC to the RP-1 server workstation for remote access and transition of control data into the RP-1 SCADA system.*

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-4 1158 Pump Station		
Electrical System		
Utility Voltage	12 kV	
Transformers	4 @ 12 kV to 480 V	
Switchgear	1 @ 480 V	
Distribution	2 @ 480 V	MCCs
Generator	1 @ 2,000 kW 2,847 Bhp	Small Pumps
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	1 unit	PLC 5
I/O Hub	1 unit	
Radio Transmitter	1 unit	RP-4
RP-1 1158 Pump Station		
Electrical System		
Utility Voltage	12 kV	
Transformers	2 @ 12 kV to 480 V	
Switchgear	2 @ 480 V	
Distribution	1 @ 480 V	MCCs
Generator	N/A	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	1 unit	
I/O Hub	1 unit	
Radio Transmitter	1 unit	RP-1
1158 Reservoirs		
Electrical System		
Utility Voltage	120 V	
Transformers	N/A	
Switchgear	N/A	
Distribution	N/A	
Generator	N/A	
Instrumentation and Control System		
HMI Workstation	N/A	
RTU	N/A	
PLC	1 unit	
I/O Hub	1 unit	PLC 5C
Radio Transmitter	1 unit	RP-4
1158 to 1050 PRV		
Electrical System		
Utility Voltage	120 V	PLC Loop
Transformers	N/A	
Switchgear	N/A	
Distribution	N/A	
Generator	1 @ 670 kW 896 Bhp	TP-1
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	1 unit	
I/O Hub	1 unit	
Radio Transmitter	1 unit	RP-1

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
RP-4 1158 Pump Station				
Electrical System	3	3	3	4
Instrumentation and Control System	3	3	3	3
RP-1 1158 Pump Station				
Electrical System	3	3	3	4
Instrumentation and Control System	3	3	3	3
1158 Reservoirs				
Electrical System	3	3	3	3
Instrumentation and Control System	3	3	3	3
1158 to 1050 PRV				
Electrical System	2	3	3	3
Instrumentation and Control System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

RP-4 1158 Pump Station:

- **Electrical System**
  RP-4 has one 2.0 MW emergency diesel generator. The generator can produce only enough power to reliably power the RP-4 1158 small pumps, reducing the overall capacity of the pump station. The RP-4 1158 pump station is the only discharge location for the facility; therefore, a utility power failure will reduce the discharge capacity for the facility. A potential project is needed to address the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.

RP-1 1158 Pump Station

- **Electrical System**
  RP-1 has three emergency diesel generators, and TP-1 has one emergency diesel generator to produce an effective electrical load of 3.5 MW. RP-1 has a varying electrical demand, ranging from 3.0 MW to as high as 4.8 MW depending on the amount of recycled water pumped. Therefore, RP-1 typically does not have the emergency generation capability to power the three recycled water pump stations located at the facility. A potential project is needed to address the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.

  Project EN13048 will provide a second 12kV feeder to TP-1 to support the RP-1 1158 pump station.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
RP-4 1158 Pump Station		
Electrical System	2004 2008	
Instrumentation and Control System	2004 2008	
RP-1 1158 Pump Station		
Electrical System	2004 2006	
Instrumentation and Control System	2004 2008	
1158 Reservoirs		
Electrical System	2008	
Instrumentation and Control System	2008	
1158 to 1050 PRV		
Electrical System	2011	
Instrumentation and Control System	2011	

Table 4 Potential Projects

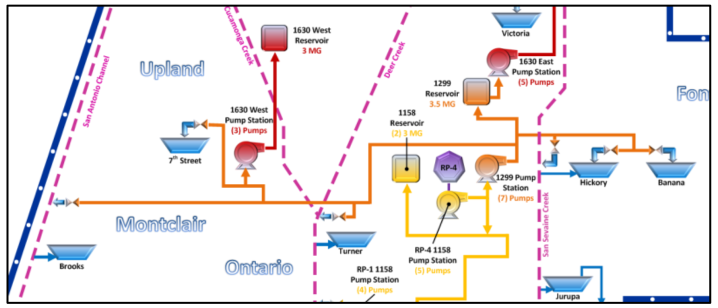
System	Project Name	Project Description
RP-4 1158 Pump Station Electrical System	Recycled Water Pump Station Emergency Generation Upgrade	Upgrade the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.
RP-1 1158 Pump Station Electrical System	Recycled Water Pump Station Emergency Generation Upgrade	Upgrade the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

1299 Pressure Zone

1. Asset Profile



1299 Reservoir
The 1299 reservoir provides recycled water supply to the 1630 east pump station suction header and the 1299 pressure zone. The 1299 reservoir is located at the intersection of East Ave. and Baseline Ave. in the City of Rancho Cucamonga on an existing Cucamonga Valley Water District (CVWD) potable water reservoir site. The 1299 reservoir has a design capacity of 3.5 million gallons (MG), a diameter of 165 feet, and a maximum water surface level of 22 feet, and is equipped with a level transmitter. The 1299 reservoir is normally operated between 4 feet and 20 feet, providing an operational capacity of 2.6 MG.

RP-4 1299 Pump Station
The RP-4 1299 pump station provides recycled water to the 1299 pressure zone for direct use by CVWD, Monte Vista Water District (MVWD), the City of Fontana, the City of Ontario, and the City of Upland, and for groundwater recharge at Brooks Basin, 8th St. Basin, Turner Basin, Hickory Basin, Banana Basin, Jurupa Basin, and RP-3 Basin. The pump station is composed of seven pumps:

- Two 350 hp horizontal-split case, VFD-driven, 4,185 gpm pumps
- Five 350 hp horizontal-split case, VFD-driven, 4,600 gpm pumps

The 1299 pump station is automatically controlled to cycle pumps on and off to maintain a time-of-day level set point of the 1299 reservoir.

1299 Pipelines

- *Etiwanda Pipeline* – 4,100 LF of 36-inch pipeline along Etiwanda Ave. from RP-4 to Whittram Ave.
- *North Etiwanda Pipeline* – 1,800 LF of 42-inch pipeline along Etiwanda Ave. from Whittram Ave. to Arrow Route.
- *Whittram Avenue Pipeline* – 7,500 LF of 16-inch along Whittram Ave. from Etiwanda Ave. to Banana Basin.
- *1299 Zone Recycled Water Pipeline* – 12,500 LF of 36-inch pipeline from the termination of the North Etiwanda Pipeline to the 1299 Reservoir.
- *RP-4 West Extension Phase I Pipeline* – 14,200 LF of 30-inch pipeline along 6th St. from Etiwanda Ave. to Cleveland Ave.
- *RP-4 West Extension Phase II Pipeline* – 10,400 LF of 30-inch pipeline from the termination of the RP-4 West Extension Phase I Pipeline at 6th St. and Cleveland Ave. to Archibald Ave. and 4th St., continuing with an additional 2,200 LF of 24-inch pipeline to 4th St. and Cucamonga Creek.
- *San Antonio Channel Segment A Pipeline* – 14,900 LF of 24-inch pipeline from the termination of the RP-4 West Extension Phase II pipeline at 4th St. and Cucamonga Creek to I St. and Sultana Ave.
- *San Antonio Channel Segment B Pipeline* – 12,200 LF of 30-inch pipeline from the termination of the San Antonio Channel Segment A Pipeline at I St. and Sultana Ave. to San Bernardino Ave. and Benson Ave., continuing with an additional 11,250 LF of 24-inch pipeline to Orchard St. Turnout.
- *7th and 8th St. Pipeline* – 10,500 LF of 16-inch pipeline from 4th St. and Corona Ave. to 8th St. Basin turnout.

Force Main Manifold (FMM) Turnout
The turnout includes two 12-inch motor-operated butterfly valves, a flow meter, and a pressure transmitter to provide recycled water to Hickory Basin and Banana Basin. The turnout is designed for flow rates ranging from 200 gpm to 6,000 gpm.

San Sevaine Channel Turnout
The turnout includes a 10-inch Cla-Val flow control valve, a flow meter, and a pressure transmitter to provide recycled water to San Sevaine Channel. Recycled water discharged in the channel can then be conveyed to Hickory Basin or to Jurupa Basin for groundwater recharge. The turnout is designed for flow rates ranging from 200 gpm to 2,200 gpm.

Turner Basin Turnout
The turnout includes a 10-inch Cla-Val flow control valve, a flow meter, and a pressure transmitter to provide recycled water to Deer Creek. Recycled water discharged in the lined creek can then be conveyed to Turner Basin Nos. 3 and 4 for groundwater recharge. The turnout is designed for flow rates ranging from 300 gpm to 3,500 gpm.

8th St. Basin Turnout
The turnout includes a 12-inch Cla-Val flow control valve, a flow meter, and a pressure transmitter to provide recycled water to 8th St. Basin. The turnout is designed for flow rates ranging from 200 gpm to 3,000 gpm.

Orchard Turnout
The turnout includes a 16-inch Cla-Val flow control valve, a flow meter, and a pressure transmitter to provide recycled water to San Antonio Channel. Recycled water discharged in the channel can then be conveyed to Brooks Basin for groundwater recharge. The turnout is designed for flow rates ranging from 1,000 gpm to 10,000 gpm.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
1299 Reservoir	3.5 MG	2.6 MG
RP-4 1299 Pumps	2 @ 4,185 gpm 5 @ 4,600 gpm	
Etiwanda Pipeline	19,000 gpm	6.0 ft/s mv
North Etiwanda Pipeline	25,900 gpm	6.0 ft/s mv
Whittram Ave. Pipeline	3,750 gpm	6.0 ft/s mv
1299 Zone Recycled Water Pipeline	19,000 gpm	6.0 ft/s mv
RP-4 West Extension Phase I Pipeline	13,200 gpm	6.0 ft/s mv
RP-4 West Extension Phase II Pipeline	30-inch – 13,200 gpm 24-inch – 8,500 gpm	6.0 ft/s mv
San Antonio Channel Segment A Pipeline	8,500 gpm	6.0 ft/s mv
San Antonio Channel Segment B Pipeline	30-inch – 13,200 gpm 24-inch – 8,500 gpm	6.0 ft/s mv
7th & 8th St. Pipeline	3,750 gpm	6.0 ft/s mv
FMM Turnout	200 – 6,000 gpm	Hist. Data
San Sevaine Channel Turnout	200 – 2,200 gpm	Hist. Data
Turner Basin Turnout	300 – 3,500 gpm	Hist. Data
8th St. Basin Turnout	200 – 3,000 gpm	Des. Spec.
Orchard Turnout	1,000 – 10,000 gpm	Des. Spec.

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
1299 Reservoir	1	2	3	2
RP-4 1299 Pumps	2	1	1	3
Etiwanda Pipeline	2	3	2	2
North Etiwanda Pipeline	2	2	2	2
Whittram Ave. Pipeline	2	4	2	2
1299 Zone Recycled Water Pipeline	2	2	2	2
RP-4 West Ext. Phase I Pipeline	2	3	2	2
RP-4 West Ext. Phase II Pipeline	2	3	2	2
San Antonio Channel Segment A	2	3	2	2
San Antonio Channel Segment B	3	3	2	2
7th & 8th St. Pipeline	3	4	3	3
FMM Turnout	3	3	2	3
San Sevaine Channel Turnout	1	1	1	3
Turner Basin Turnout	1	3	3	3
8th St. Basin Turnout	3	3	3	3
Orchard Turnout	1	2	2	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

1299 Reservoir
There is only one level transmitter for the reservoir. If the level transmitter fails, it shuts down the entire system. A redundant level transmitter should be installed on the reservoir. These issues should be addressed by the Maintenance Department.

RP-4 1299 Pumps
The motors may not be rated for outdoor installation. If not, the motors will need to be covered. Further evaluation is needed to determine if a potential project is needed.

Whittram Ave. Pipeline Capacity
At a max velocity of 6 ft/s, the Whittram Ave. pipeline has a capacity of 3,750 gpm. The San Sevaine Channel turnout has a max flow of 2,200 gpm, and the FMM turnout has a maximum flow of 6,000 gpm, which exceeds the Whittram Ave. pipeline max recommended velocity.

7th and 8th St. Pipeline Capacity
At a maximum velocity of 6 ft/s, the 7th and 8th St. pipeline has a capacity of 3,750 gpm. The 8th St. basin turnout has a maximum flow of 3,000 gpm, and the 1630 west recycled water pump station has a maximum flow of 4,000 gpm. Therefore, the 1630 west recycled water pump station and 8th St. basin turnout cannot be operated simultaneously without exceeding the maximum recommended velocity of the pipeline.

San Sevaine Channel Turnout
Condition assessment in 2014 identified the force main, extending from the Jurupa Basin along Mulberry Ave to the RP-3 Basin near Hemlock Ave, has at least two electrical discontinuities between stations 06050 and 07060, and between 10090 and 12120. This needs to be addressed by a potential project to ensure adequate cathodic protection.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
1299 Reservoir	2011	
RP-4 1299 Pumps	2008	
Etiwanda Pipeline	2003	2014 Report
North Etiwanda Pipeline	2008	2014 Report
Whittram Ave. Pipeline	2004	2014 Report
1299 Zone RW Pipeline	2011	2014 Report
RP-4 West Ext. Phase I	2005	2014 Report
RP-4 West Ext. Phase II	C2006	2014 Report
San Antonio Channel Segment A Pipeline	2007	2014 Report
San Antonio Channel Segment B Pipeline	2007	
7th & 8th St. Pipeline	2007	
FMM Turnout	2006	
San Sevaine Channel	2006	2014 Report
Turner Basin Turnout	2006	
8th St. Basin Turnout	2007	
Orchard Turnout	2007	

Table 4 Potential Projects

System	Project Name	Project Description
1299 Pressure Zone	1299 Pressure Zone Cathodic Protection	Per 2014 Corrpro Report: Repair electrical discontinuities on Jurupa force main, and repair test stations on the North Etiwanda pipeline, Antonio Channel Seg A, RP4 Western Extension Phase 1 and Phase 2.
7th & 8th St. Pipeline Capacity	1299 Pressure Zone Pipeline Capacity Upgrades	Upgrade 7th & 8th street pipeline to provide sufficient capacity to not exceed the recommended velocity of the pipeline during peak demand.
Whittram Ave. Pipeline Capacity	1299 Pressure Zone Capacity Upgrades	Upgrade Whittram avenue pipeline to provide sufficient capacity to not exceed the recommended velocity of the pipeline during peak demand.

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

Auxiliary Systems – 1299 Pressure Zone

1. Asset Profile

RP-4 1299 Pump Station

- *Electrical System* – The electrical energy to power the RP-4 1299 pump station is obtained from the RP-4 treatment facility, which receives power from the local electrical grid (SCE) and from onsite energy generation (wind and emergency generators). The wind assets are owned and operated by a private firm as part of power purchase agreements. The electrical feed from the grid is composed of a 12 kV feeder to the power panel switch gear, where transformers and switchgear are located to distribute electrical energy throughout the facility. A single line diagram of the RP-4 electrical system is shown in Appendix B. The RP-4 treatment facility has one 2.0 MW diesel generator located in the northern portion of the facility; however, the generator was not designed to maintain operation of the recycled water pump stations during a power failure.
- *Instrumentation and Control System* – An extensive array of instruments is used to monitor and control the processes for the RP-4 1299 pump station. All the processes of the pump station are observed and controlled by a local PLC system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the RP-4 1299 pump station electrical room. Fiber optic cable is then used to connect the local PLC to the RP-4 server workstation for remote access.

1299 Reservoir

See 1630 East Auxiliary System Summary Sheet.

FMM Turnout

- *Electrical System* – The electrical energy to power the FMM Turnout is obtained from the local electrical grid (SCE). A single line diagram of the FMM Turnout is shown in Appendix B. The turnout does not have emergency power generation in case of power failure.
- *Instrumentation and Control System* – Local control wiring for flow and valve position for the both Hickory and Banana basins is fed back to the remote telemetry unit. The turnout has a 10dB yagi antenna that transmits control data to RP-4, which routes the information to RP-1 to the GWR workstation server for control and remote access.

San Sevaine Channel Turnout

- *Electrical System – The electrical energy to power the San Sevaine Turnout is obtained from the Hickory Basin Rubber Dam Control House, which receives power from the local electrical grid (SCE). A single line diagram of the San Sevaine Channel Turnout and Hickory Basin Rubber Dam Control House is shown in Appendix B. The turnout does not have emergency power generation in case of power failure.*
- *Instrumentation and Control System – Local control wiring for flow and valve position is fed back to the local valve control panel, which then directs the information to a local control panel in the Hickory Basin Rubber Dam Control House. The Control House has a 10dB yagi antenna that transmits control data to RP-4, which routes the information to RP-1 to the GWR workstation server for control and remote access.*

Turner Basin Turnout

- *Electrical System* – The electrical energy to power the Turner Basin Turnout is obtained from the local electrical grid (SCE). A single line diagram of the Turner Basin Turnout is shown in Appendix B. The turnout does not have emergency power generation in case of power failure.
- *Instrumentation and Control System* – Local control wiring for flow and valve position is fed back to a local control panel and PLC. The turnout has a 9dB yagi antenna that transmits control data to RP-4, which routes the information to RP-1 to the GWR workstation server for control and remote access.

8th Street Basin Turnout

- *Electrical System* – The electrical energy to power the 8th Street Basin Turnout is obtained from the local electrical grid (SCE). A single line diagram of the Turner Basin Turnout is shown in Appendix B. The turnout does not have emergency power generation in case of power failure.
- *Instrumentation and Control System* – Local control wiring for flow and valve position is fed back to a local PLC. The turnout has a 9dB yagi antenna that transmits control data to an additional local PLC panel for 8th Street Basin before being transmitted by radio to RP-1 to the GWR workstation server for control and remote access.

Orchard Turnout

- *Electrical System* – The electrical energy to power the Orchard Turnout is obtained from the local electrical grid (SCE). A single line diagram of the Orchard Turnout is shown in Appendix B. The turnout does not have emergency power generation in case of power failure.
- *Instrumentation and Control System* – Local control wiring for flow and valve position as well as pressure are fed back to a local control panel and PLC. The data is transmitted by phone line to the GWR workstation server at RP-1 for control and remote access.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-4 1299 Pump Station		
Electrical System		
Utility Voltage	12 kV	
Transformers	2 @ 12 kV to 480 V	
Switchgear	1 @ 480 V	MCCs
Distribution	1 @ 480 V	
Generator	N/A	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	1 unit	PLC 5B
I/O Hub	1 unit	
Radio Transmitter	1 unit	RP-4
FMM Turnout		
Electrical System		
Utility Voltage	120 V	
Transformers	N/A	
Instrumentation and Control System		
HMI Workstation	N/A	
RTU	1 unit	
PLC	N/A	
I/O Hub	1 unit	
Radio Transmitter	1 unit	
San Sevaine Turnout		
Electrical System		
Utility Voltage	480 V	
Transformers	1 @ 480 V to 120 V	
Instrumentation and Control System		
HMI Workstation	N/A	
RTU	N/A	
PLC	N/A	
I/O Hub	1 unit	
Radio Transmitter	1 unit	
Turner Basin Turnout		
Electrical System		
Utility Voltage	120 V	
Transformers	N/A	
Instrumentation and Control System		
HMI Workstation	N/A	
RTU	1 unit	
PLC	1 unit	
I/O Hub	1 unit	
Radio Transmitter	1 unit	
8th Street Basin Turnout		
Electrical System		
Utility Voltage	120 V	
Transformers	N/A	
Instrumentation and Control System		
HMI Workstation	2 units	
RTU	N/A	
PLC	2 units	
I/O Hub	1 unit	
Radio Transmitter	3 units	
Orchard Turnout		
Electrical System		
Utility Voltage	120 V	
Transformers	N/A	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	1 unit	
I/O Hub	1 unit	
Radio Transmitter	N/A	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
RP-4 1299 Pump Station				
Electrical System	2	3	3	4
Instrumentation and Control System	2	3	3	3
FMM Turnout				
Electrical System	3	3	3	3
Instrumentation and Control System	3	3	3	3
San Sevaine Turnout				
Electrical System	3	3	3	3
Instrumentation and Control System	3	3	3	3
Turner Basin Turnout				
Electrical System	3	3	3	3
Instrumentation and Control System	3	3	3	3
8th Street Basin Turnout				
Electrical System	3	3	3	3
Instrumentation and Control System	3	3	3	3
Orchard Turnout				
Electrical System	3	3	3	3
Instrumentation and Control System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

RP-4 1299 Pump Station Emergency Generation

RP-4 has one 2.0 MW emergency diesel generator. The generator can produce only enough power to reliably power the RP-4 1158 small pumps; therefore, it cannot maintain the operation of the 1299 pump station during a power failure. A potential project is needed to address the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
RP-4 1299 Pump Station		
Electrical and I&C	2008	
FMM Turnout		
Electrical and I&C	2006	
San Sevaine Turnout		
Electrical and I&C	2006	
Turner Basin Turnout		
Electrical and I&C	2006	
8th Street Basin Turnout		
Electrical and I&C	2007	
Orchard Turnout		
Electrical and I&C	2007	

Table 4 Potential Projects

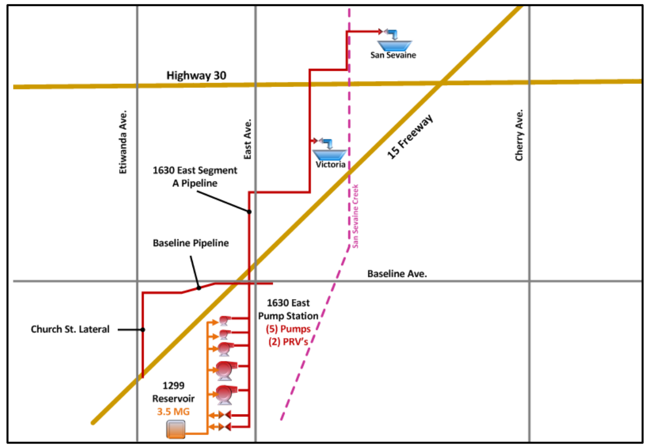
System	Project Name	Project Description
RP-4 1299 Pump Station Electrical System	Recycled Water Pump Station Emergency Generation Upgrade	Upgrade the emergency generator system to provide sufficient power during peak recycled water pump station electrical demand.

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

1630 East Pressure Zone

1. Asset Profile



1630 East Pump Station
The 1630 east pump station provides recycled water to the 1630 east pressure zone for direct use by CVWD and the City of Fontana and for groundwater recharge at Victoria and San Sevaine basins. The pump station is composed of five pumps:

- Two 100 hp vertical-turbine, VFD-driven, 750 gpm pumps
- One 200 hp vertical-turbine, constant speed, 1,500 gpm pump
- Two 400 hp vertical-turbine, constant speed, 3,000 gpm pumps

The 1630 east pump station is automatically controlled using a proportional-integral-derivative controller (PID) to maintain a discharge-pressure set point of 150 psi. In addition, the pump station has two 12-inch pressure-reducing valves (PRV) to transfer recycled water from the 1630 east pressure zone back to the 1299 pressure zone to be used with the future 1630 east reservoir.

1630 East Pipelines

- *Segment A Pipeline* – 11,300 LF of 36-inch pipeline from the 1630 East Pump Station to San Sevaine Turnout.
- *Baseline Pipeline* – 1,650 LF of 24-inch and 30-inch pipeline along Baseline Ave. from Etiwanda Ave. to Heritage Circle.
- *Church Street Lateral* – 2,350 LF of 12-inch pipeline along Etiwanda Ave. from Baseline Ave. to Church St.

Victoria Basin Turnout
The turnout includes an 8-inch Cla-Val flow control valve, a flow meter, and a pressure transmitter to provide recycled water to the groundwater recharge basin. The turnout is designed for flow rates ranging from 200 gpm to 3,000 gpm.

San Sevaine Basin Turnout
The turnout includes a 12-inch Cla-Val flow control valve, a flow meter, and a pressure transmitter to provide recycled water to the groundwater recharge basin. The turnout is designed for flow rates ranging from 400 gpm to 6,700 gpm.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
1630 East Pumps	2 @ 750 gpm 1 @ 1,500 gpm 2 @ 3,000 gpm	VFD Constant Constant
1630 East PRVs	2 @ 10,000 gpm	Need to verify in field
Segment A Pipeline	19,000 gpm	6.0 ft/s max velocity
Baseline Pipeline	13,000 gpm	6.0 ft/s max velocity
Church Street Lateral	2,000 gpm	6.0 ft/s max velocity
Victoria Basin Turnout	200 – 3,000 gpm	
San Sevaine Basin Turnout	400 – 6,700 gpm	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
1630 East Pumps	2	2	3	2
1630 East PRVs	1	1	2	2
Segment A Pipeline	1	2	1	1
Baseline Pipeline	1	2	2	1
Church Street Lateral	1	2	2	1
Victoria Basin Turnout	1	2	2	2
San Sevaine Basin Turnout	1	1	2	2

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

1630 East Pumps
When both Victoria and San Sevaine basins are not receiving recycled water, the minimum 1630 east pressure zone flow is causing the small 100 hp pumps to operate continuously at minimum speed with zero measurable flow. Further investigation is needed to determine whether programming changes can resolve the issue or whether a small jockey pump may be required. Further internal investigation needs to take place to determine if a potential project is needed.

The existing surge tank compressor does not have the capacity to effectively displace the water in the tank after surge events. Multiple failures of the surge tank compressor have been documented and reported to Engineering. Project EN13051 will address these issues.

1630 East PRVs
No issues requiring immediate attention

Segment A Pipeline
No issues requiring immediate attention

A condition assessment in 2014 that the test stations were functioning as intended, but an electrical discontinuity was detected between stations 07010 and 09020, but the soil has "Negligible Corrosivity."

Baseline Pipeline
No issues requiring immediate attention

Church Street Lateral
No issues requiring immediate attention

Victoria Basin Turnout
No issues requiring immediate attention

San Sevaine Basin Turnout
No issues requiring immediate attention

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
1630 East Pumps	2011	
1630 East PRVs	2011	
Segment A Pipeline	2011	2014 Report
Baseline Pipeline	2011	
Church Street Lateral	2011	
Victoria Basin Turnout	2011	
San Sevaine Basin Turnout	2011	

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

Auxiliary Systems – 1630 East Pressure Zone

1. Asset Profile

1630 East Pump Station and 1299 Reservoir

- *Electrical System – The electrical energy to power the 1630 east pump station is obtained from the local electrical grid (SCE). The electrical feed from the grid is composed of a 12 kV feeder to the 1630 east pump station electrical room, where transformers and switchgear are located to distribute electrical energy throughout the pump station. A single line diagram of the 1630 east pump station electrical system is shown in Appendix B. The 1630 east pump station does not have emergency power generation in case of power failure; however, it does have a generator termination cabinet to allow for quick connection of a portable generator.*
- *Instrumentation and Control System – An extensive array of instruments is used to monitor and control the processes for the 1630 east pump station and 1299 reservoir. All the processes of the pump station are observed and controlled by a local PLC system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the 1630 east pump station electrical room. Radio is then used to connect the local PLC to the RP-4 server workstation for remote access.*

Victoria Basin Turnout

- *Electrical System – The electrical energy to power the Victoria Basin Turnout is obtained from the local electrical grid (SCE). A single line diagram of the Victoria Basin Turnout is shown in Appendix B. The turnout does not have emergency power generation in case of power failure.*
- *Instrumentation and Control System – Local control wiring for flow and valve position is fed back to a local control panel and PLC, which transmits control data to the Victoria Basin Main remote terminal unit (RTU). The Victoria Basin Main RTU has a radio that transmits control data to RP-4, which routes the information to RP-1 to the GWR workstation server for control and remote access.*

San Sevaine Basin Turnout

- *Electrical System* – The electrical energy to power the Victoria Basin *Turnout is obtained from the local electrical grid (SCE). A single line diagram of the Victoria Basin Turnout is shown in Appendix B. The turnout does not have emergency power generation in case of power failure.*
- *Instrumentation and Control System – Local control wiring for flow and valve position is fed back to a remote I/O hub, which radios control data to the San Sevaine Basin No. 3 RTU. The San Sevaine Basin No. 3 RTU has a radio that transmits control data to RP-4, which routes the information to RP-1 to the GWR workstation server for control and remote access. In addition, there is a San Sevaine Basin Turnout Main RTU that radios information back to RP-4.*

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
1630 East Pump Station		
Electrical System		
Utility Voltage	12 kV	
Transformers	1 @ 12 kV to 480 V	
Switchgear	1 @ 480 V	
Distribution	1 @ 480 V	MCCs
Generator	N/A	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	1 unit	
PLC	2 units	
I/O Hub	1 unit	
Radio Transmitter	1 unit	
Victoria Basin Turnout		
Electrical System		
Utility Voltage	120 V	
Transformers	N/A	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	1 unit	
PLC	1 unit	
I/O Hub	2 units	
Radio Transmitter	3 units	
San Sevaine Basin Turnout		
Electrical System		
Utility Voltage	120 V	
Transformers	N/A	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	2 units	
PLC	2 units	
I/O Hub	3 units	
Radio Transmitter	4 units	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
1630 East Pump Station				
Electrical System	2	3	3	3
Instrumentation and Control System	3	3	3	3
Victoria Basin Turnout				
Electrical System	2	3	3	3
Instrumentation and Control System	3	3	3	3
San Sevaine Basin Turnout				
Electrical System	2	3	3	3
Instrumentation and Control System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Electrical System
No issues require specific attention.

Instrumentation and Control System
No issues require specific attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
1630 East Pump Station		
Electrical System	2011	
Instrumentation and Control System	2011	
Victoria Basin Turnout		
Electrical System	2011	
Instrumentation and Control System	2011	
San Sevaine Channel Turnout		
Electrical System	2011	
Instrumentation and Control System	2011	

Table 4 Potential Projects

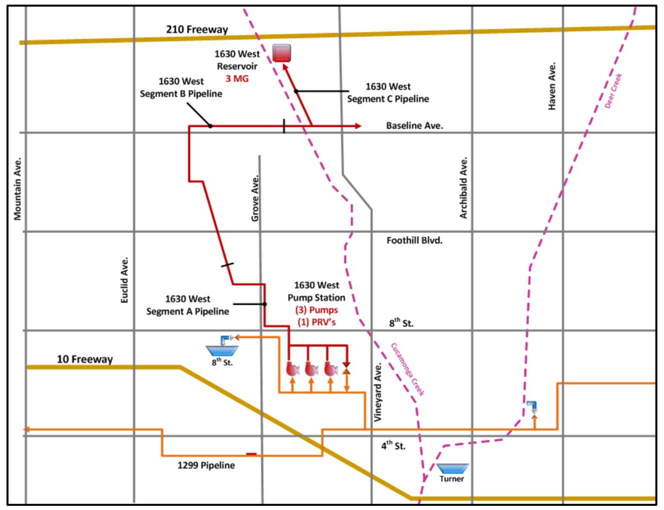
System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

1630 West Pressure Zone

1. Asset Profile



1630 West Reservoir
The 1630 west reservoir provides recycled water storage for the 1630 west pressure zone. The 1630 west reservoir is located at the intersection of 19th St. and Cucamonga Creek in the City of Rancho Cucamonga on an existing Cucamonga Valley Water District (CVWD) pump station site. The 1630 east reservoir has a design capacity of 3 million gallons (MG), a diameter of 130 feet, and a maximum water surface level of 32 feet, and is equipped with a level transmitter. The 1630 west reservoir is normally operated between 4 feet and 28 feet, providing an operational capacity of 2.4 MG.

1630 West Pump Station
The 1630 west pump station provides recycled water to the 1630 west pressure zone for direct use by CVWD and the City of Upland. The pump station is composed of three 250 hp vertical-turbine, constant-speed, and 2,000 gpm pumps. The 1630 east pump station is automatically controlled to cycle pumps on and off to maintain a time-of-day level set point of the 1630 west reservoir. In addition, the pump station has one 10-inch pressure reducing valve (PRV) to transfer recycled water from the 1630 west pressure zone back to the 1299 pressure zone.

1630 West Pipelines
- *Segment A Pipeline* – 10,500 LF of 24-inch pipeline from the 1630 West Pump Station to Upland Memorial Park.
- *Segment B Pipeline* – 13,000 LF of 24-inch pipeline from Upland Memorial Park to the intersection of 16th St. (Baseline Rd.) and Tanglewood Ave.
- *Segment C Pipeline* – 800 LF of 24-inch pipeline and 3,100 LF of 30-inch pipeline along Baseline Rd. from Tanglewood Ave. to Vineyard Ave. Segment C Pipeline includes an additional 4,400 LF of 30-inch pipeline along Cucamonga Creek from Baseline Rd. to the 1630 west reservoir.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
1630 West Reservoir	3 MG	2.4 MG (Op. Cap.)
1630 West Pumps	3 @ 2,000 gpm	Constant
1630 West PRV	300 – 3,000 gpm	Need to verify in field
Segment A Pipeline	8,500 gpm	6.0 ft/s max velocity
Segment B Pipeline	8,500 gpm	6.0 ft/s max velocity
Segment C Pipeline	24-inch – 8,500 gpm 30-inch – 13,200 gpm	6.0 ft/s max velocity

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
1630 West Reservoir	1	1	1	1
1630 West Pumps	1	1	2	2
1630 West PRV	1	3	3	2
Segment A Pipeline	1	1	1	1
Segment B Pipeline	1	1	1	1
Segment C Pipeline	1	1	1	1

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

1630 West Pumps
Operations has noticed surge in both the 1299 and 1630 pressure zones when the 1630 west pumps are started or stopped. The surge can be in excess of 40 psi from standard operating conditions. The 1630 west surge tank and pump start controls are being reviewed to see if this condition can be eliminated with existing equipment. Project EN15050 will perform a surge analysis and manage the risks of the 1299 pressure zone and will install a surge tank on the suction side of the 1630 West Pumps.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
1630 West Reservoir	2012	
1630 West Pumps	2012	
1630 West PRV	2012	
Segment A Pipeline	2012	
Segment B Pipeline	2012	
Segment C Pipeline	2012	

Table 4 Potential Projects

System	Project Name	Project Description
1630 West Pumps	1299 pressure zone pipeline surge tank	Install a surge tank on the 1299 pressure zone pipeline. To be located at the 1630 west pump station.

System Summary Continued on Next Page

Asset Management System Summary – RW/GWR

Auxiliary Systems – 1630 West Pressure Zone

1. Asset Profile

1630 West Pump Station

- *Electrical System* – The electrical energy to power the 1630 west pump station is obtained from the local electrical grid (SCE). The electrical feed from the grid is composed of a 12 kV feeder to the 1630 east pump station electrical room, where transformers and switchgear are located to distribute electrical energy throughout the pump station. A single line diagram of the 1630 west pump station electrical system is shown in Appendix B. The 1630 west pump station does not have emergency power generation in case of power failure; however, it does have a generator termination location in the MCC to allow for quick connection of a portable generator.
- *Instrumentation and Control System* – An extensive array of instruments is used to monitor and control the processes for the 1630 west pump station. All of the processes of the pump station are observed and controlled by a local PLC system. Local control wiring is fed from the individual pieces of equipment to an I/O hub and PLC in the 1630 west pump station electrical room. Radio is then used to connect the local PLC to the RP-4 server workstation for remote access.

1630 West Reservoir

- *Electrical System – The electrical energy to power the 1630 west reservoir is obtained from the local electrical grid (SCE). A single line diagram of the 1630 west reservoir is shown in Appendix B. The reservoir does not have emergency power generation in case of power failure.*
- *Instrumentation and Control System – Local control wiring for level and valve position are fed back to a local control panel and PLC. The RTU has a radio that transmits control data to RP-4, which routes the information to RP-1 for control and remote access.*

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
1630 West Pump Station		
Electrical System		
Utility Voltage	12 kV	
Transformers	1 @ 12 kV to 480 V 1 @ 12 kV to 120 V	
Switchgear	1 @ 480 V	
Distribution	1 @ 480 V	MCCs
Generator	N/A	
Instrumentation and Control System		
HMI Workstation	1 unit	
RTU	N/A	
PLC	1 unit	
I/O Hub	1 unit	
Radio Transmitter	1 unit	
1630 West Reservoir		
Electrical System		
Utility Voltage	480	
Transformers	1 @ 480 V to 120 V	
Switchgear	N/A	
Distribution	N/A	MCCs
Generator	N/A	
Instrumentation and Control System		
HMI Workstation	N/A	
RTU	1 unit	
PLC	1 unit	
I/O Hub	1 unit	
Radio Transmitter	1 unit	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
1630 West Pump Station				
Electrical System	2	3	3	3
Instrumentation and Control System	3	3	3	3
1630 West Reservoir				
Electrical System	2	3	3	3
Instrumentation and Control System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Electrical System

No issues require specific attention.

Instrumentation and Control System

No issues require specific attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
1630 West Pump Station		
Electrical System	2012	
Instrumentation and Control System	2012	
1630 West Reservoir		
Electrical System	2012	
Instrumentation and Control System	2012	

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

End of System Summary

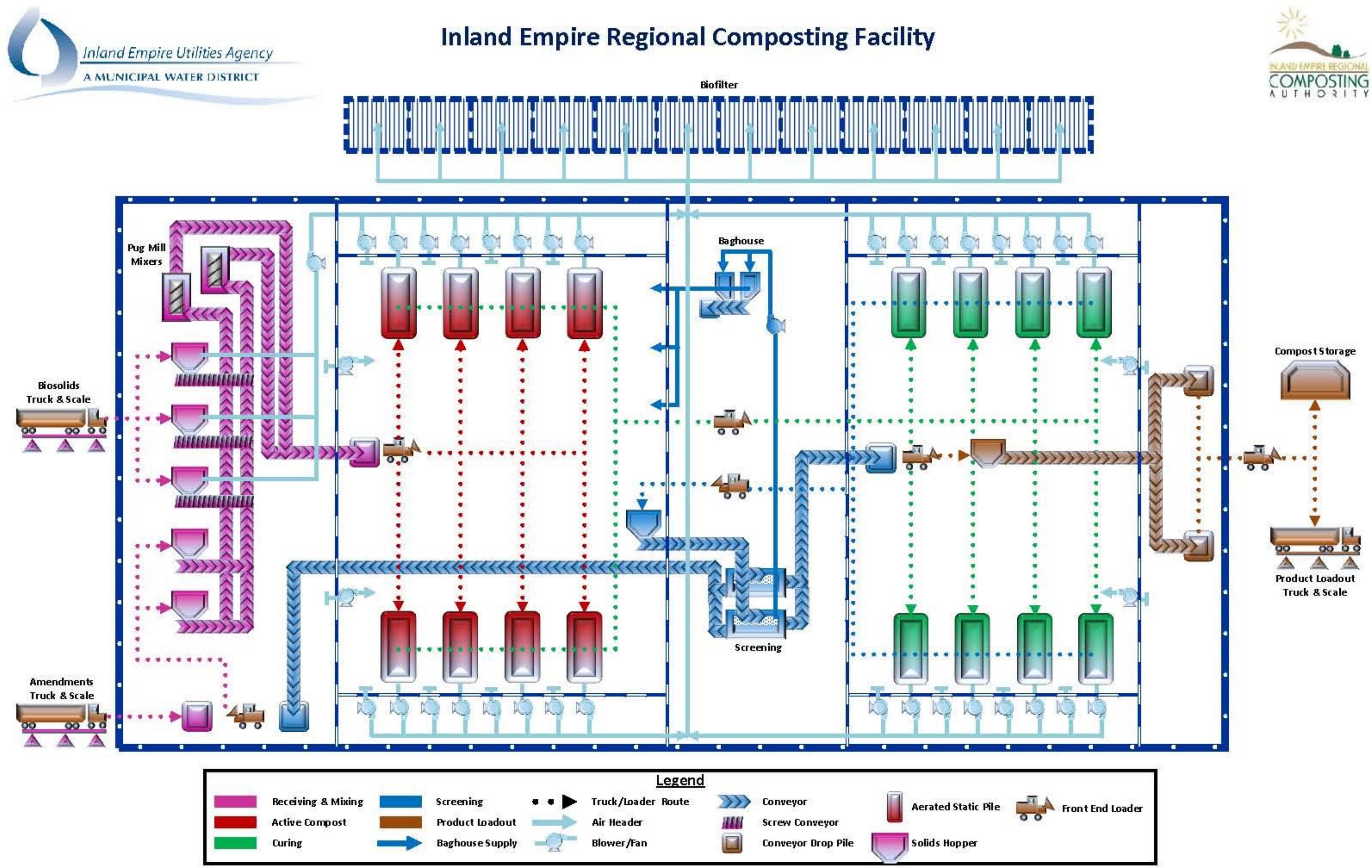


Figure 7-7: Inland Empire Regional Composting Facility (IERCF) – Schematic

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Table 7-8: Inland Empire Regional Composting Facility – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	RA11001	IERCF Capital Replacement	General project for facility/equipment repair and replacement, including replacement of front end loaders, and evaluation of the Baghouse.	RM	RP	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	5,000,000
2	RA11004	IERCF Process Improvements	The belt conveyance system will be modified to transfer material from Active to Curing, then from Curing to Screening. Currently, the system transfers material from Active to Screening and then Screening to Curing.	RM	CC	50,000	0	0	0	0	0	0	0	0	0	50,000
3	RA12009	IERCF Structure Protection	Column protection and repair.	RM	OM	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	250,000
4	RA12011	IERCF Lighting Improvements	Additional lighting is going to be installed in all process areas to increase visibility for front end loader operators.	RM	OM	200,000	0	0	0	0	0	0	0	0	0	200,000
5	RA14003	IERCF Receiving Pit & Fan Corridor Drains	Installation of drains in the receiving pit and fan corridors for housekeeping purposes.	RM	CC	200,000	0	0	0	0	0	0	0	0	0	200,000
6	RA15001	IERCF Baghouse Improvements	Based upon system evaluation, this project is to improve the existing Baghouse, install new blowers downstream of the Baghouse structure, and install a foam fire suppression system.	RM	RP	50,000	0	0	0	0	0	0	0	0		50,000
7	TBD	IERCF Trommel Screen Improvements	Retrofit existing trommel screen equipment	RM	OM	0	0	0	300,000	0	0	0	0	0	0	300,000
8	TBD	IERCF Fire Sprinkler Improvements	Retrofit the fire sprinkler system pipelines and Victaulic fittings.	RM	CC	75,000	200,000	200,000	0	0	0	0	0	0	0	475,000
9	TBD	IERCF Transition Air Duct Improvements	Upgrade the foul-air rectangular transition air duct running north/south through the active curing screening.	RM	CC	0	500,000	0	0	0	0	0	0	0	0	500,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014
(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)
(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

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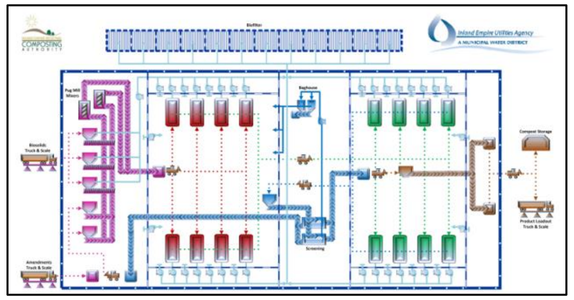
Asset Management System Summary – IERCF
Treatment Process

1. Asset Profile



Biosolids Hoppers
Biosolids from Los Angeles County Sanitation District (LACSD), Inland Empire Utilities Agency, and third-party sources are transported by trucks to the Inland Empire Regional Composting Facility (IERCF). After being weighed, the trucks offload the biosolids into three biosolids hoppers. Each biosolids hopper has a capacity of 55 cubic yards, five 3 hp live-bottom screws, and one 25 hp screw conveyor.

Amendment Hoppers
Amendments from outside sources are transported to IERCF by truck and stored along the western wall of the active compost process area. These amendments are mixed with recycled screening material (overs) to produce specific amendment blends. Front end loaders (FEL) mix the material and load it into two amendment hoppers. Each amendment hopper has a 200-ton capacity, five 3 hp live-bottom screws, and one 33-foot, 110-ton-per-hour belt conveyor powered by a 15 hp motor.

Pug Mill Mixers
Material from the biosolids hoppers and the amendment hoppers is conveyed by belt conveyors to two redundant pug mill mixers. The pug mill mixers blend the biosolids and amendments together to create an appropriate blend of material to begin the active compost process. Each pug mill mixer has a capacity of 225 tons per hour and is powered by a 75 hp motor.

Belt Conveyors
Belt conveyors are used to move material throughout IERCF. Nine belt conveyors allow material to be moved from receiving and mixing to active compost. Seven belt conveyors allow material to be moved from active compost through screening to curing. An additional four belt conveyors return the overs from screening to receiving and mixing. Two belt conveyors allow material to be moved from curing to product loadout.

Active Compost HVAC
Supply air into the active compost process area is provided by the following:

- Seven 20 hp, 18,250 cfm fans pulling from receiving and mixing
- Nine 20 hp, 23,000 cfm roof fans
- Five 75 hp, 25,650 cfm fans pulling from screening/Baghouse

Air is exhausted from the active compost area to the biofilter by:

- Four 125 hp, VFD-driven, 35,500 cfm exhaust fans
- Twelve 125 hp, 28,400 cfm exhaust fans
- Twenty-two 30 hp, VFD-driven, 4,500 cfm process fans

Curing HVAC
Supply air into the curing process area is provided by:

- Four 25 hp, 20,500 cfm fans pulling from product loadout
- Five 10 hp, 18,000 cfm roof fans
- Fourteen 20 hp, 2,850 cfm process fans

Air is exhausted from the active compost area to the biofilter by:

- Four 150 hp, VFD-driven, 42,250 cfm exhaust fans
- Two 125 hp, 35,000 cfm exhaust fans

Trommel Screens
After the material has been treated in the active compost and curing processes, it is placed into a hopper and conveyed to two Trommel screens to remove the overs. The fine material is conveyed to product loadout as the final compost product and the overs are conveyed back to receiving and mixing to be recycled back into the amendments. Each Trommel screen has 3/8-inch spacing and a 400-cubic-yard-per-hour production capacity and is powered by a 150 hp motor.

Baghouse
The Baghouse filters the air from the Trommel screens and the screenings process area and returns filtered air back to the active compost process area. The Baghouse is supplied by five 75 hp, 25,650 cfm fans and removes particulate matter from the air and conveys it to a storage area located in the screenings process area.

Biofilter
The biofilter is required to treat all air leaving IERCF to remove ammonia and VOCs. The biofilter is sized to treat 813,200 cfm of air, consists of twelve 135' x 87' cells, an irrigation system, and an inlet air humidification system.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Facility Biosolids Amendment	 600 wet tons per day 160 wet tons per day	
Biosolids Hoppers	3 @ 55 cy 5 @ 3 hp live bottom 1 @ 25 hp sc. conv.	 ea. hop. ea. hop.
Amendment Hoppers	2 @ 200 tons 5 @ 3 hp live bottom 1 @ 15 hp belt conv.	 ea. hop. ea. hop.
Pug Mill Mixers	2 @ 75 hp, 225 tph	
Receiving & Mixing Belt Conveyors	1 @ 20 hp, 162 ft 1 @ 20 hp, 144 ft 1 @ 25 hp, 70 ft 1 @ 25 hp, 91 ft 1 @ 25 hp, 80 ft 1 @ 25 hp, 75 ft 1 @ 30 hp, 215 ft 1 @ 30 hp, 219 ft 1 @ 30 hp, 258 ft	All units are 225 tons per hour (tph)
Screening Belt Conveyors	2 @ 20 hp, 91', 150 tph 1 @ 15 hp, 133', 150 tph 2 @ 15 hp, 27', 150 tph 1 @ 25 hp,157', 190 tph 1 @ 25 hp, 136', 190 tph 1 @ 15 hp, 32', 110 tph 1 @ 15 hp, 77', 110 tph 1 @ 20 hp, 172', 110 tph 1 @ 30 hp, 537', 110 tph	
Product Loadout Belt Conveyors	1 @ 20 hp, 135', 145 tph 1 @ 15 hp, 113', 145 tph	
Active Compost HVAC	7 @ 20 hp, 18,250 cfm 9 @ 20 hp, 23,000 cfm 5 @ 75 hp, 25,650 cfm 4 @ 125 hp, 35,500 cfm 12 @ 125 hp, 28,400 cfm 22 @ 30 hp, 4,500 cfm	R&M Fan Roof Fan BH Fan Ex. Fan Ex. Fan Pr. Fan
Curing HVAC	4 @ 25 hp, 20,500 cfm 5 @ 10 hp, 18,000 cfm 14 @ 20 hp, 2,850 cfm 4 @ 150 hp, 42,250 cfm 2 @ 125 hp, 35,000 cfm	PL Fan Roof Fan Pr. Fan Ex. Fan Ex. Fan
Trommel Screens	2 @ 3/8-inch, 150 hp, 400 cyh	
Baghouse	2 @ 65,000 cfm 5 @ 75 hp, 25,650 cfm	Filters Fans
Biofilter	813,200 cfm	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Biosolids Hoppers	2	3	2	2
Amendment Hoppers	2	3	2	2
Pug Mill Mixers	3	2	2	3
Receiving & Mixing Belt Conveyors	2	2	2	3
Screening Belt Conveyors	4	3	3	3
Product Loadout Belt Conveyors	4	3	3	3
Active Compost HVAC	2	3	3	2
Curing HVAC	4	3	3	2
Trommel Screens	3	3	4	4
Baghouse	5	4	4	4
Biofilter	4	2	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Screening Belt Conveyors
Project RA11004 will modify the belt conveyance system to transfer material from Active to Curing, then from Curing to Screening. Currently, the system transfers material from Active to Screening and then Screening to Curing.

Curing HVAC
A potential project will modify the foul-air-rectangular-transition air duct running north/south through screenings has multiple air leaks at the joints. This project will improve the system to prevent such leaks in the future.

Trommel Screen Operation
The Trommel screens have required monthly maintenance because of parts failures resulting in extended equipment downtime. IERCF is currently running a pilot study of a shaker screen to gather operational data on the effectiveness of this type of equipment. A potential project will address this issue.

Baghouse Operation
The Baghouse operation has been ineffective in removing particulate matter from the Trommel screens and screenings process area. IERCF had to construct a temporary cover around the exhaust of the Trommel screens to allow adequate supply air flow to the Baghouse. In addition, concerns have been raised about the applicability of an indoor Baghouse as it relates to OSHA requirements. Project RA15001 will install blowers downstream of the Baghouse structure and install a foam fire suppression system.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Biosolids Hoppers	2007	
Amendment Hoppers	2007	
Pug Mill Mixers	2007	
Receiving & Mixing Belt Conveyors	2007	
Screening Belt Conveyors	2007	
Product Loadout Belt Conveyors	2007	
Active Compost HVAC	2007	
Curing HVAC	2007	
Trommel Screens	2007 2013	
Baghouse	2007	
Biofilter	2007	

Table 4 Potential Projects

System	Project Name	Project Description
Trommel Screens	IERCF Trommel Screen Improvements	Retrofit existing trommel screen equipment
Active Curing Screening	IERCF Transition Air Duct Improvements	Upgrade the foul-air rectangular transition air duct running north/south through the active curing screening.
Biofilter	IERCF Biofilter Media Replacement	Full replacement of the biofilter media in all 12 cells, recurring every 5 years. Turnover of existing biofilter media and replenishment of material as necessary, annually. This will not be conducted on years of a full media replacement.

System Summary Continued on Next Page

Asset Management System Summary – IERCF
Auxiliary Systems

1. Asset Profile

Plant Drain
The plant drain collects sewer from the truck scale house and administration building, wash-down water from the truck cleaning area and process areas, and excess irrigation and condensate from the biofilter system. The plant drain system consists of five submersible pump stations: north process area, south process area, biofilter west, biofilter east, and center aisle duct. These five pump stations pump to the plant drain pump station. The plant drain pump station pumps to either the inlet of RP-4 or to the Non-Reclaimable Waste System (NRWS). Currently, the system is being pumped to the NRWS.

Electrical System
The electrical energy to power the treatment facility is obtained from the local electrical grid (SCE) and from onsite energy generation (solar and an emergency generator). The solar assets are owned and operated by private firms as part of power purchase agreements. The electrical feed from the grid is composed of dual 12 kV feeders from RP-4 to the IERCF north and south electrical rooms, where transformers and switchgear are located to distribute electrical energy throughout the facility. A single line diagram of the IERCF electrical system is shown in Appendix B.

A diesel emergency generator is used in the event of a power failure. A 2.0 MW generator is located on the southeast corner of the IERCF property and can supply power to meet maximum daytime production of the facility.

An extensive lighting system is needed to illuminate the indoor facility. Lighting units are located in each of the process areas, on equipment walls, and on the building support columns.

Utility Water System
Utility water is used throughout the facility for irrigation, biofilter irrigation and humidification, truck wash-down, and general cleaning purposes. The system is supplied by the 1299 pressure zone from a connection on 6th Street. The piping consists of several isolation valves and point-of-use connections.

Potable Water System
Potable water is used throughout the plant for restrooms, cooling, and more. The system is supplied from two service connections on 6th Street from the City of Rancho Cucamonga. IERCF also has an independent fire suppression system with two connections on 6th Street.

Instrumentation and Control System
An extensive array of instruments is used to monitor and control the processes at IERCF. Nearly all of the processes at the plant are observed and controlled from a centralized SCADA system. Control wiring and local panels are provided at individual pieces of equipment, and control wiring transmits data to a redundant PLC system located in the main control building. Fiber optic cable is then run to RP-4 for remote access.

Yard Piping
A substantial network of pipes exists mainly for the auxiliary systems. The material, sizes, and service conditions of these pipes vary widely. A yard piping diagram is show in Appendix C.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Plant Drain	3 @ 620 gpm 20 hp	VFD
Electrical System Utility Voltage Transformers Switchgear Distribution Generator Mounted Lighting	 12 kV 4 @ 12 kV to 480 V 5 @ 480 V to 120 V 4 @ 12 kV 2 @ 12 kV 8 @ 480 V 1 @ 2,000 kW 2,937 Bhp 345 units	 MCCs Process
Utility Water System Pipelines Valves	 8-inch PVC @ 3,750 gpm 6-inch PVC @ 2,100 gpm 5 units	 Main Line
Potable Water System Pipelines	 2 @ 2.5-inch DI @ 350 gpm 10-inch DI @ 5,800 gpm	 Potable Fire
Instrumentation and Control System HMI Workstation RTU PLC I/O Hub Radio Transmitter	 4 units N/A 4 units 6 units 1 unit	 RP-4
Yard Piping	See Appendix C	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor: Condition	Redundancy	Function	Reliability
Plant Drain	3	2	2	2
Electrical System	2	2	3	3
Utility Water System	3	3	3	3
Potable Water System	4	3	3	3
Instrumentation and Control System	3	2	3	3
Yard Piping	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Plant Drain
No issues require specific attention.

Electrical System
No issues require specific attention.

Utility Water System
No issues require specific attention.

Potable Water System
A potential project will retrofit the fire sprinkler system pipelines and Victaulic fittings.

Instrumentation and Control System
No issues require specific attention.

Yard Piping
No issues require specific attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Plant Drain	2007	
Electrical System	2007 2011	
Utility Water System	2007	
Potable Water System	2007	
Instrumentation and Control System	2007	
Yard Piping	2007	

Table 4 Potential Projects

System	Project Name	Project Description
Potable Water System	IERCF Fire Sprinkler Improvements	Retrofit the fire sprinkler system pipelines and Victaulic fittings.

End of System Summary

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

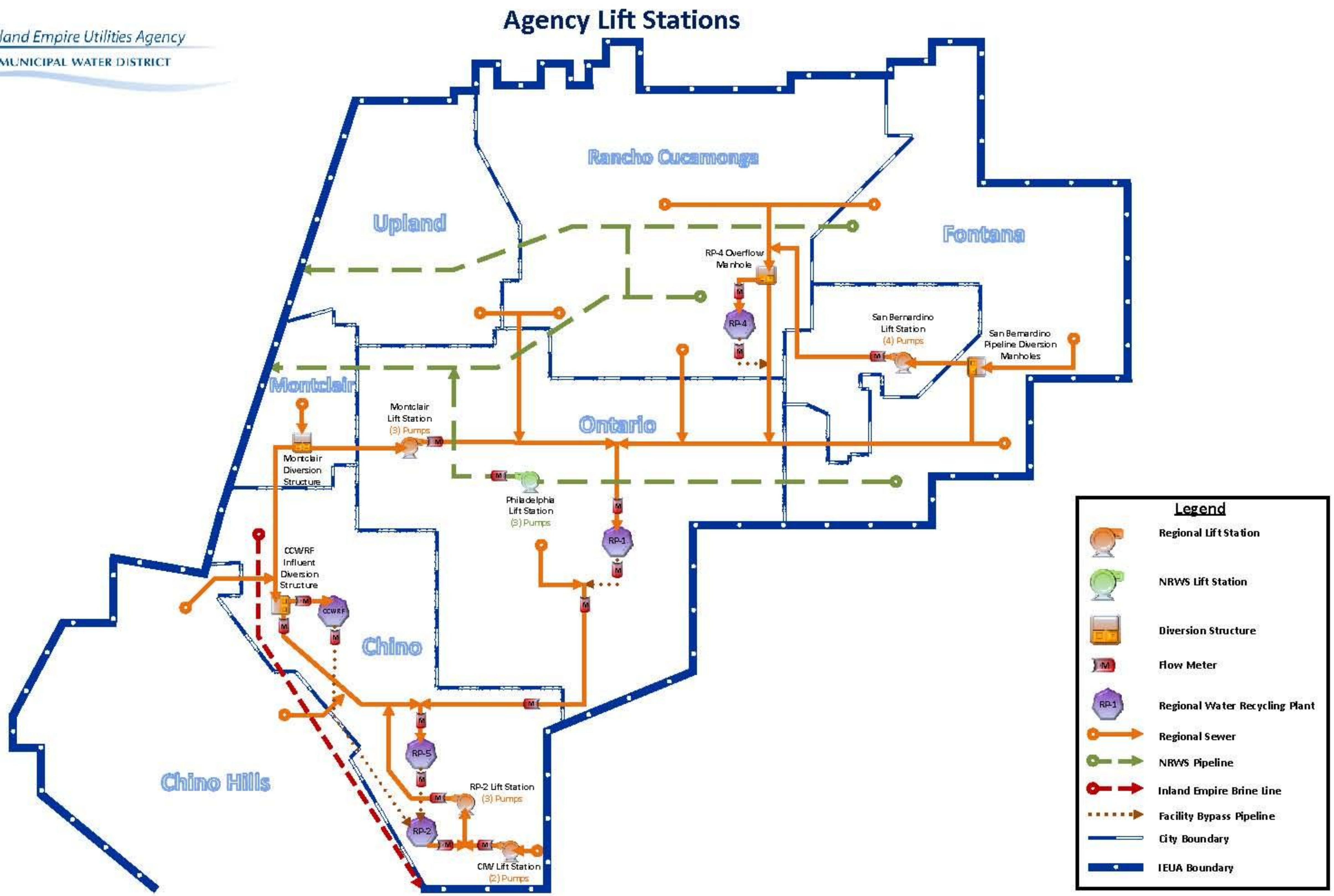


Figure 7-8: Agency Lift Stations (LS) – Schematic

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Table 7-9: Agency Lift Stations – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN11035	Philadelphia Pump Station Upgrades	Repair and replacement of section of the force mains in the pump dry sump. Miscellaneous instrumentation and facility improvements will be made. A redundant PLC will also be supplied to provide control system reliability.	NC	CC	50,000	0	0	0	0	0	0	0	0	0	50,000
2	EN13028	Preserve Lift Station	A sewer lift station design prepared by the City of Chino will be reviewed by IEUA. The SCADA system will be connected to IEUA's system; therefore, the lift station SCADA components will be reviewed for conformance to our system.	RC	OM	100,000	100,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	2,600,000
3	EN13054	Montclair Lift Station Upgrades	Replacement of all three lift pumps as well as replacement and improvements of the control and instrumentation system and the electrical distribution system.	RO	CC	50,000	0	0	0	0	0	0	0	0	0	50,000
4	EN16011	Whispering Lakes LS Improvements	Complete rehab of lift station. Replacement of all equipment, replacement of all electrical systems, replacement of control system, and rehab of gates and structures.	RC	CC	0	0	0	0	0	0	0	500,000	2,500,000	2,000,000	5,000,000
5	EN19005	Haven LS Improvements	Connect to the SCADA enterprise system and potential sewer force main line added/construction.	RC	CC	0	0	0	300,000	500,000	200,000	0	0	0	0	1,000,000
6	TBD	Philadelphia Lift Station Force Main Improvements	Replace the force mains, as well as provide inspection manholes for future condition assessment on the entire length along Philadelphia. Replace 12" line with a new 18" line and add cleanouts every 500 ft.	NC	RP	0	0	0	0	0	0	0	500,000	2,500,000	3,000,000	6,000,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014
(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)
(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

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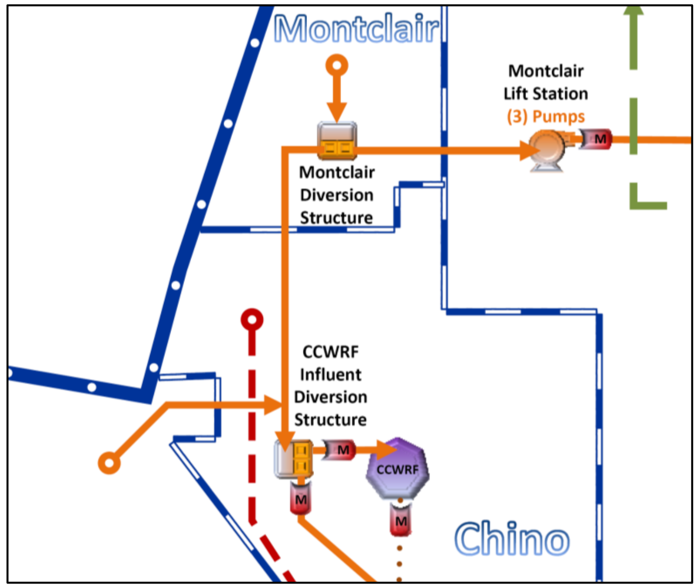
Asset Management System Summary – LS

Montclair Lift Station

1. Asset Profile



Pump System
The Montclair lift station conveys flows collected from the Montclair service area as well as a portion of Ontario. The pump station consists of a small circular wet well and three lift pumps.

Electrical System
The electrical energy to power the lift station is obtained from the local electrical grid (SCE). The electrical feed from the grid is composed of a 12 kV feeder to the transformer and switchgear. A single line diagram of the Montclair lift station electrical system is shown in Appendix B.

A diesel emergency generator is used in the event of a power failure. One generator is located inside the pump station and supplies power to the facility in the event of a utility outage.

Potable Water System
Potable water is supplied to the station for supply at several hose bibs. The water system formerly supplied seal water to the old pumps.

Instrumentation and Control System
All aspects of the pump station operations are monitored and controlled by the instrumentation and control system. The control system includes a redundant PLC and communication modules for maximum reliability.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Montclair Lift Station	5.69 MGD	
Pump System Pipelines Pump Station Valves	 18-inch 3,950 gpm 3 @ 2,990 gpm 85 hp 7 units	
Electrical System Utility Voltage Transformers Switchgear Distribution Generator Mounted Lighting	 12 kV 12 kV to 480 V 480 V 480 V 1 @ 250 kW 398 Bhp 17 units	
Potable Water System Backflow Devices Valves	 1 units 2 units @ 2-inch	
Instrumentation and Control System HMI Workstation PLC I/O Hub Radio Transmitter	 1 Ea. 2 Ea. (Redundant Pair) 1 Ea. 1 Ea.	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Pump System	4	4	4	4
Electrical System	3	3	3	3
Potable Water System	3	3	3	3
Instrumentation and Control System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Pump System
Project EN13054 will address replacing the lift station pumps to reduce ragging and maintenance labor. The pumps were selected for their ability to resist clogging from rags and other large objects. The project will be completed early 2015.

If continued ragging of pumps is experienced upon starting up the new pumping system, grinders will be installed ahead of the pumps to prevent further clogging of the pumps, and a potential project will need to be created.

Electrical System
After the lift station upgrade, the backup generator capacity no longer matches the capacity of the utility service and can only support two pumps in service. The backup generator may need to be upgraded to a unit with a higher capacity if it is determined that it is necessary to accommodate a scenario where all three lift pumps are in operation.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Pump System	1978 2014	
Electrical System	1978 2014	
Potable Water System	1978	
Instrumentation and Control System	1978 2014	

Table 4 Potential Projects

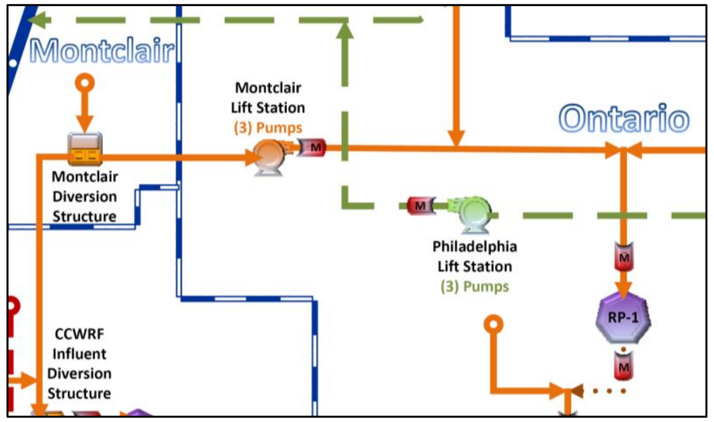
System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – LS

Philadelphia Lift Station

1. Asset Profile



Pump System
The Philadelphia lift station conveys non-reclaimable waste (NRW) That is collected from the northern half of the Agency service area to Los Angeles County. The lift station includes three pumps: two of which are variable speed and one that is constant speed. Flows are conveyed through two parallel force mains that are about 2.6 miles long, with a total head increase of about 110 feet.

In case of emergency and to accommodate maintenance and construction activity, an engine-driven pump is also available. The pump connections are located outdoors, and the pump can be trailered away off-site when it is not needed.

Electrical System
The electrical energy to power the treatment facility is obtained from the local electrical grid (SCE). The electrical feed from the grid is 480 V. A single line diagram of the electrical system is shown in Appendix B.

A diesel emergency generator is used in a power failure. The generator is located in the pump station and supplies power to all the pump station systems.

Utility Water System
Utility water is used for pump seal water. The water is delivered by the 1050 zone recycled water pipeline in Philadelphia Avenue.

Potable Water System
Potable water is supplied to the lift station for the restroom. Potable water can also be used as a backup for pump seal water in a recycled-water outage. The potable and recycled water is isolated by use of a removable pipe spool to prevent cross connections.

Instrumentation and Control System
The lift station is fully automated and monitored. Wet well level, force main discharge pressures, force main flows, and pump speeds are all controlled and monitored by a PLC. The lift station can also be monitored and controlled remotely.

Chemical Injection System
The lift station includes storage and injection systems for ferric chloride. The chemical can be injected to both force mains. Ferric chloride is used to control sulfides in the sewer system, reducing the effects of corrosion and odors. The injection pumps are started and stopped automatically.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Philadelphia Lift Station	5.2 MGD	
Pump System		
Pipelines	12-inch 1,150 gpm 18-inch 2,800 gpm	
Pump Station	3 @ 1,800 gpm 100 hp	
Wet Well	80,000 Gallons	
Emergency Lagoon	1 @ 5 MG unlined	
Valves	13 units	
Electrical System		
Utility Voltage	480 V	
Switchgear	480 V	
Distribution	480 V	
Generator	1 @ 250 kW 335 Bhp	
Mounted Lighting	19 units	
Utility Water System		
Pipelines	< 2 in. diameter	
Valves	1 units	
Potable Water System		
Backflow Devices	1 units	
Valves	3 units	
Instrumentation and Control System		
HMI Workstation	1 units	
PLC	1 units	
I/O Hub	1 units	
Radio Transmitter	1 units	
Chemical Injection		
Chemical Pumps	2 units	Diaphragm
Storage Tank	1 @ 13,000 Gallons	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Pump System	3	3	3	3
Force Mains	4	4	4	4
Electrical System	3	3	3	3
Utility Water System	3	3	3	3
Potable Water System	3	3	3	3
Instrumentation and Control System	3	3	3	3
Chemical Injection	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Pump System
No issues require special attention.

Force Mains
The condition of the 12-inch and 18-inch force mains has not been inspected for the entire length of pipe. Both force mains are approaching 50 years in age and approaching the end of its service life. A potential project is required to replace the force mains, as well as provide inspection manholes for future condition assessment.

Electrical System
No issues require special attention.

Utility Water System
No issues require special attention.

Instrumentation and Control System
No issues require special attention.

Chemical Injection
No issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Pump System	1968	2013
Electrical System	1968 2007	
Utility Water System	2011	
Potable Water System	1968	
Instrumentation and Control System	2007	
Chemical Injection	1993	

Table 4 Potential Projects

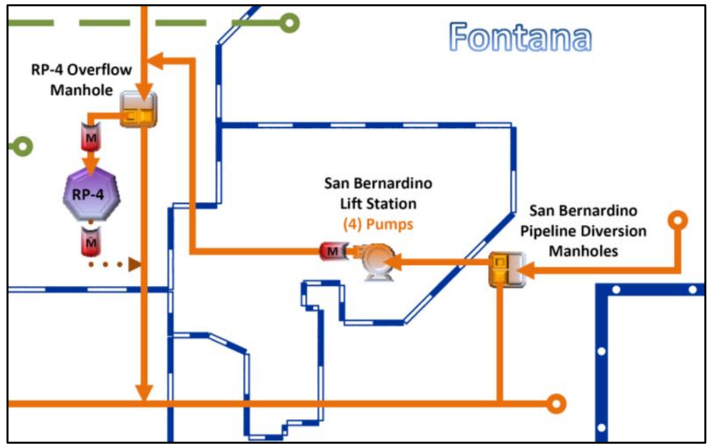
System	Project Name	Project Description
Force Mains	Philadelphia Lift Station Force Main improvements	Replace the force mains, as well as provide inspection manholes for future condition assessment

System Summary Continued on Next Page

Asset Management System Summary – LS

San Bernardino Avenue Lift Station

1. Asset Profile



Pump System
The San Bernardino Avenue lift station conveys flows from the Fontana area to Regional Plant No. 4. The flows are lifted about 60 feet through about 1.4 miles of force main. To maintain acceptable flow velocities, two force mains of different diameters were provided. Four vertical-turbine pumps are provided with provisions for a future pump to be added to the wet well.

Electrical System
The electrical energy to power the lift station is obtained from the local electrical grid (SCE) and from onsite energy generation (emergency generator). The electrical feed from the grid is composed of a 12 kV feeder to a transformer and switchgear to distribute electrical energy throughout the facility. A single line diagram of the electrical system is shown in Appendix B.

A diesel emergency generator is used in a power failure. The generator is located adjacent to the electrical room for the lift station.

Potable Water System
Potable water is supplied to the site to be used as seal water for the lift pumps. The water is supplied to a storage tank by an air gap, and the tank in turn supplies the seal-water pump system.

Instrumentation and Control System
The lift station includes enough instrumentation and a PLC to allow for full control of the lift station remotely. The PLC and I/O include full redundancy for added reliability.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
San Bernardino Lift Station	7 MGD	
Pump System Pipelines Pump Station Valves Seal Water Tank Seal Water Pumps	 30-inch 5,902 gpm 24-inch 13,890 gpm 2 @ 3,300 gpm 50 hp 2 @ 6,945 gpm 125 hp 7 units 1 @ 2,900 Gal. 1 @ 50 Gal. 2 Ea.	 Secondary Primary
Electrical System Utility Voltage Transformers Switchgear Distribution Generator Mounted Lighting	 12 kV 12 kV to 480 V 480 V 480 V 1 @ 500 kW 757 Bhp 19 units	
Potable Water System Backflow Devices Valves	 1 units 2 units	
Instrumentation and Control System HMI Workstation RTU PLC I/O Hub	 1 Ea. 2 Ea. 2 Ea. 2 Ea.	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Pump System	3	3	3	3
Electrical System	3	3	3	3
Potable Water System	3	3	3	3
Instrumentation and Control System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Pump System
Currently no issues require special attention.

Electrical System
Currently no issues require special attention.

Potable Water System
Currently no issues require special attention.

Instrumentation and Control System
Currently no issues require special attention.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Pump System	2007	
Electrical System	2007	
Potable Water System	2007 2013	
Instrumentation and Control System	2007 2012	

Table 4 Potential Projects

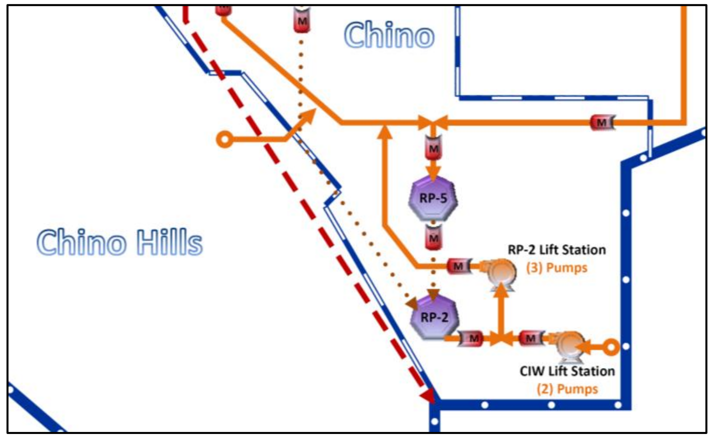
System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – LS

Regional Plant No.2 (RP-2) Lift Station

1. Asset Profile



Pump System
The RP-2 lift station collects raw sewage from the Mountain Avenue interceptor, CIW sewer, Butterfield force main, and the recycle flows from the solids treatment facilities at RP-2, and discharges through a 24-inch pipeline to the RP-5 headworks. The lift station is located on the RP-2 treatment plant site.

Electrical System
The electrical energy to power the lift station is fed from the RP-2 treatment plant distribution system. A separate backup generator for the lift station has been provided if utility power or the RP-2 distribution systems fail.

Instrumentation and Control System
The lift station includes instrumentation and automation to allow full remote control of the facility.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
RP-2 Lift Station	9.5 MGD	
Pump System Pipelines Pump Station Valves	 24-inch 6,600 gpm 3 @ 3,300 gpm 100 hp 6 units	
Electrical System Utility Voltage Transformers Switchgear Distribution Generator Mounted Lighting	 12 kV 12 kV to 480 V 480 V 480 V 1 @ 300 kW 443 Bhp > 2 units	
Instrumentation and Control System HMI Workstation RTU PLC I/O Hub	 1 Ea. 1 Ea. 1 Ea. 1 Ea.	
Yard Piping	See Appendix C	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Pump System	3	3	3	3
Electrical System	3	3	3	3
Instrumentation and Control System	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Pump System
Due to the location and elevation of the RP-2 Lift Station, it will need to be relocated when the RP-5 Solids Treatment Facility is constructed to replace the RP-2 Solids Treatment Facility. The new lift station will be addressed by project EN19006.

Electrical System
Currently no issues require special attention.

Instrumentation and Control System
Currently no issues require investigation.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Pump System	2000	
Electrical System	2000	
Instrumentation and Control System	2000	

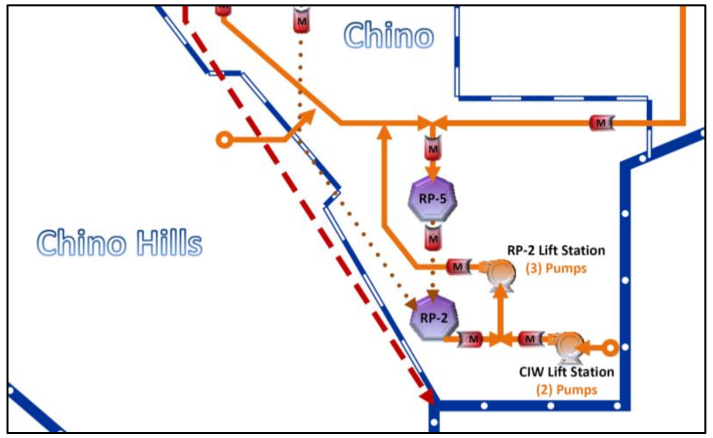
Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – LS
Chino Institute for Woman (CIW)

1. Asset Profile



Pump System
The CIW (or Prado) lift station serves the Chino Institute for Women Correctional Facility as well as Prado Park. The lift station consists of a small circular wet well with two submersible chopper pumps and a sewage grinder.

The area surrounding the CIW lift station has recently undergone development. The area, known as the Preserve, is currently bypassing sewage to the Inland Empire Brine Line and conveying it to Orange County. The City of Chino is designing and will construct a new lift station to convey the Preserve area flows to RP-5. The new lift station will also handle the flows lifted by the CIW, and the CIW lift station will be abandoned. The City of Chino will own the new lift station and reimburse the Agency for the operation and maintenance of the facility.

Instrumentation and Control System
The lift station is provided with local controls only. A control panel is tied to float switches and a sonic level transmitter to locally start and stop the pumps.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
CIW Lift Station	1 MGD	
Pump System Pipelines Pump Station Sewage Grinder	 8-inch 1,300 gpm 2 @ 650gpm 30 hp 1 Ea.	
Electrical System Utility Voltage Transformers Distribution	 4,160 V 4,160 V to 480 V 480 V	
Instrumentation and Control System Control Panel	 1 Ea.	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Pump System	4	4	3	4
Electrical System	4	4	3	4
Instrumentation and Control System	4	4	4	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Pump System
The pump system is undersized and is out of date. The City of Chino plans to replace the pump station to accommodate flows from the recently developed area known as the Preserve. This lift station would be abandoned upon completion of the new lift station and would be operated by IEUA. Project EN13028 will address these issues.

Electrical System
Currently no issues require special attention.

Instrumentation and Control System
The control system allows for only local control and has no alarm capabilities.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Pump System	1976 1993	
Electrical System	1976 1993	
Instrumentation and Control System	1976 1993	

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

End of System Summary

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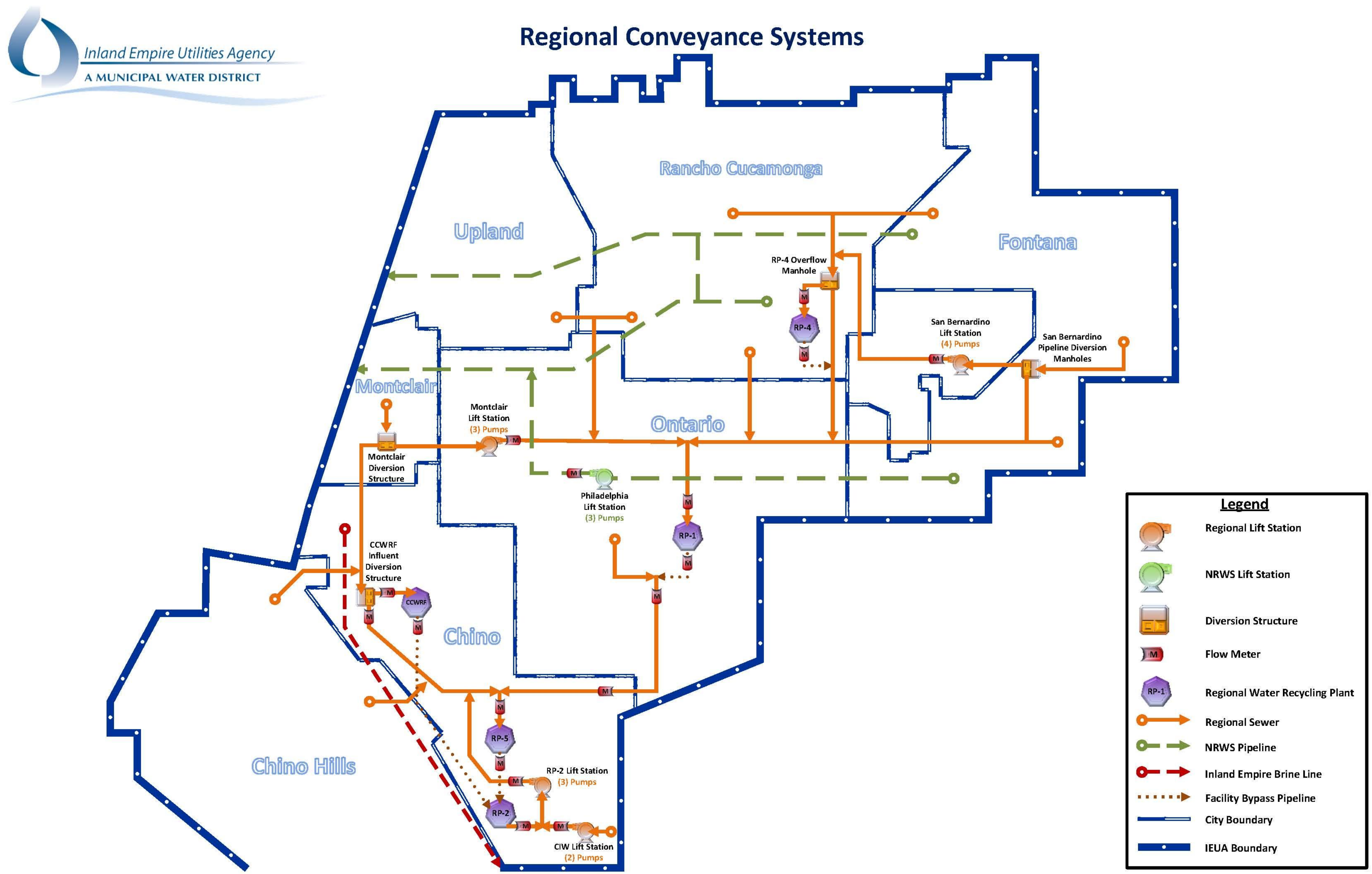

Figure 7-9: Regional Conveyance System (RC) – Schematic

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Table 7-10: Regional Conveyance System – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN13018	Montclair Diversion Structure Rehabilitation	The project entails retrofitting the diversion structure and overcome safety issues.	RC	OM	850,000	0	0	0	0	0	0	0	0	0	850,000
2	EN15045	Collection System Manhole Upgrades FY 15/16	Repair and replace a total of twenty-two (22) sewer collection system manhole frames and covers.	RC	RP	500,000	0	0	0	0	0	0	0	0	0	500,000
3	EN15046	NRW Manhole Upgrades FY 15/16	Repair eight (8) NRW collection system manholes.	NC	CC	350,000	0	0	0	0	0	0	0	0	0	350,000
4	TBD	NRWS Manhole Upgrades	Repair NRW Manholes and lines as determined by Maintenance.	NC	RP	0	350,000	200,000	1,500,000	200,000	200,000	200,000	200,000	200,000	1,500,000	4,550,000
5	EN22002	NRW East End Flowmeter Replacement	Flowmeter replacement required by NRWS Agreement.	NC	RP	0	0	0	0	0	0	0	45,000	255,000	0	300,000
6	TBD	Collection System Upgrades	Repair and replace sewer collection system manhole frames and covers.	RC	RP	0	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	4,500,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014
(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)
(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

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Asset Management System Summary – RC

Northern Regional Sewer System

1. Asset Profile

The Agency's regional wastewater treatment provides domestic and industrial disposal systems across a 242-square-mile service area to eight contracting agencies. These contracting agencies include the City of Chino, Chino Hills, Cucamonga Valley Water District, Fontana, Montclair, Ontario, Upland, and Monte Vista Water District.

The Regional Sewer System (RSS) conveys primarily domestic wastewater to IEUA's four regional water recycling facilities. The RSS has been separated into two systems and will be referred to in the system summary sheets as the Northern Regional Sewer System and Southern Regional Sewer System. The operation and maintenance of the RSS systems are the responsibility of the IEUA's Pretreatment and Source Control (PT&SC) Department's Collections System Group.

Northern Regional Sewer System

The Northern Regional Sewer System consists of sewer pipelines north of the 60 freeway terminating into RP-1.

Gravity Sewer System:

- Archibald Trunk – 18,776 LF of pipeline from Archibald Ave. and Inland Empire Blvd. to Haven Ave. and Francis St, consisting of 742 LF of 54-inch piping, 2,549 LF of 36-inch piping, 5,000 LF of 30-inch piping, 1,707 LF of 24-inch piping, 917 LF of 20-inch piping, and 7,860 LF of 18-inch piping.
- Cucamonga Interceptor Relief – 10,043 LF of RCP pipeline from Haven Ave. to RP-1 on Cedar Ave, consisting of 786 LF of 81-inch piping, 7,203 LF of 72-inch piping, 843 LF of 60-inch piping, and 1,210 LF of 54-inch piping.
- Cucamonga Interceptor – 11,382 LF of RCP pipeline from Haven Ave. to RP-1 on Cedar Ave, consisting of 208 LF of 84-inch piping, 1,310 LF of 72-inch piping, 8,255 LF of 42-inch piping, and 1,609 LF of 27-inch piping.
- Cucamonga Trunk Relief - 12,398 LF of RCP pipeline from 10 Fwy. to Francis St. on Hermosa Ave and Haven Ave.
- Etiwanda Trunk – 29,542 LF of VCP pipeline from Eastend Ave. to Jurupa Ave. on Etiwanda Ave, consisting of 3,596 LF of 42-inch piping, 4,882 LF of 36-inch piping, 2,056 LF of 30-inch piping, 3,049 LF of 27-inch piping, 12,157 LF of 24-inch piping, 1,761 LF of 21-inch piping, 968 LF of 15-inch piping, and 2042 LF of 12-inch piping.
- Fontana Interceptor – 40,691 LF: 33,128 LF of pipeline from Live Oak Ave. to Haven Ave. on Marlay St. and Francis St., consisting of 5,396 LF of 39-inch piping, 7,657 LF of 36-inch piping, 13,138 LF of 33-inch piping, 4,915 LF of 21-inch piping, and 393 LF of 18-inch piping.
- Fontana Interceptor Relief – 36,119 LF of pipeline from Beech Ave. to Milliken Ave on Jurupa Ave, consisting of 5,187 LF of 78-inch piping, 508 LF of 72-inch piping, 12,105 LF of 66-inch piping, 3,925 LF of 54-inch piping, 1,804 LF of 48-inch piping, 977 LF of 42-inch piping, 260 LF of 36-inch piping, 5,595 LF of 30-inch piping, 2,415 LF of 27-inch piping, 260 LF of 24-inch piping, and 3,080 LF of 21-inch piping.
- Freeway Trunk – 6,076 LF of VCP pipeline along 10 Fwy. from 6th St. to 4th St., consisting of 74 LF of 39-inch piping, 208 LF of 33-inch piping, 2,219 LF of 27-inch piping, 3,169 LF of 18-inch piping, 166 LF of 15-inch piping, and 166 LF of 12-inch piping.
- Grove Avenue Outfall – 22,888 LF of VCP piping from Grove Ave. and 8th St. to Cucamonga Ave. and Mission Ave. to Carlos Ave., consisting of 270 LF of 42-inch piping, 8,917 LF of 36-inch piping, 8,060 LF of 30-inch piping, 1,395 LF of 27-inch piping, 236 LF of 24-inch, 689 LF of 21-inch, and 3,318 LF of 18-inch piping.
- Grove Interceptor – 4,042 LF: 3,964 LF of VCP pipeline from 8th St. to 5th St. on Grove Ave, consisting of 465 LF of 36-inch piping and 3,508 LF of 30-inch piping.
- Montclair Interceptor – 41,197 LF: 37,432 LF of VCP pipeline from Roswell Ave. and Grand Ave. to RP-1 on Philadelphia St., consisting of 720 LF of 67-inch piping, 1,510 LF of 60-inch piping, 31,349 LF of 30-inch piping, 494 LF of 27-inch, 392 LF of 24-inch, 2,658 LF of 21-inch and 308 LF of 12-inch piping.
- Turner Trunk – 2,562 LF of 24-inch VCP pipeline from 4th St. to 10 Fwy. on Turner St.
- Upland Interceptor – 10,870 LF of 30-inch VCP pipeline from Imperial Ave. and Mission Ave. to Carlos Ave. and Philadelphia Ave.
- Upland Interceptor Relief – 19,623 LF of VCP pipeline from 4th St. to Mission Ave. on Imperial St, consisting of 2,525 Lf of 36-inch piping, 2,325 LF of 30-inch, 1,205 LF of 27-inch, 749 LF of 24-inch, 7,422 LF of 21-inch, 3,295 LF of 18-inch, and 2,044 LF of 15-inch piping.

Force Main System:

- Montclair Lift Force Main – 4,366 LF of ductile iron pipeline from Montclair Lift Station to Euclid Ave.
- San Bernardino Lift Force Main

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Archibald Trunk	54-inch – 62 MGD 36-inch – 18.1 MGD 30-inch – 21.5 MGD 24-inch – 11.9 MGD 20-inch – 8.3 MGD 18-inch – 7.4 MGD	3.1 ft/s 2.9 ft/s 2.0 ft/s 2.3 ft/s 6.0 ft/s 6.0 ft/s
Cucamonga Interceptor Relief	81-inch – 254 MGD 72-inch – 105 MGD 60-inch – 214 MGD 54-inch – 71.8 MGD	6.2 ft/s 4.0 ft/s 6.0 ft/s 5.6 ft/s
Cucamonga Interceptor	84-inch – 238 MGD 72-inch – 158 MGD 42-inch – 21.2 MGD 27-inch – 15.3 MGD	6.0 ft/s 5.6 ft/s 2.0 ft/s 6.0 ft/s
Cucamonga Trunk Relief	39-inch – 29.5 MGD 36-inch – 34.6 MGD 33-inch – 34.0 MGD 30-inch – 29.9 MGD 27-inch – 30.4 MGD 24-inch – 23.4 MGD	4.4 ft/s 5.8 ft/s 6.0 ft/s 5.6 ft/s 6.0 ft/s 5.2 ft/s
Etiwanda Trunk	42-inch – 41 MGD 36-inch – 45 MGD 30-inch – 28 MGD 27-inch – 14 MGD 24-inch – 18 MGD 21-inch – 14 MGD 18-inch – 6 MGD	3.0 ft/s 7.0 ft/s 5.0 ft/s 5.0 ft/s 7.0 ft/s 6.0 ft/s 6.0 ft/s
Fontana Interceptor	39-inch – 15.9 MGD 36-inch – 19.4 MGD 33-inch – 11.1 MGD 21-inch – 10.8 MGD 18-inch – 12.7 MGD	1.7 ft/s 2.1 ft/s
Fontana Interceptor Relief	78-inch – 98.4 MGD 72-inch – 79.8 MGD 66-inch – 83.5 MGD 54-inch – 67.4 MGD 48-inch – 79.5 MGD 42-inch – 18.6 MGD 36-inch – 17.6 MGD 30-inch – 18.3 MGD 27-inch – 23.2 MGD 21-inch – 12.3 MGD	
Freeway Trunk	39-inch – 20.6 MGD 33-inch – 18.4 MGD 27-inch – 23.6 MGD 18-inch – 8.0 MGD 15-inch – 14.7 MGD 12-inch – 8 MGD	
Grove Avenue Outfall	42-inch – 21 MGD 36-inch – 34 MGD 30-inch – 31.8 MGD 27-inch – 29 MGD 24-inch – 23.6 MGD 21-inch – 9.7 MGD 18-inch – 10.4 MGD	
Grove Interceptor	36-inch – 36.9 MGD 30-inch – 42.1 MGD	
Montclair Interceptor	67-inch – 149 MGD 60-inch – 58 MGD 30-inch – 7 MGD 27-inch – 6.7 MGD 24-inch – 9 MGD 21-inch – 8.5 MGD	5.8 ft/s 3.6 ft/s 1.2 ft/s 1.2 ft/s 2.0 ft/s 2.5 ft/s
Turner Trunk	24-inch – 16 MGD	6 ft/s
Upland Interceptor	30-inch – 25.9 MGD	5.5 ft/s
Upland Interceptor Relief	36-inch – 31.6 MGD 30-inch – 31.5 MGD 27-inch – 16.1 MGD 24-inch – 13.1 MGD 21-inch – 15.9 MGD 18-inch – 7.4 MGD 15-inch – 5.2 MGD	5.4 ft/s 7.8 ft/s 5.9 ft/s 5.7 ft/s 7.0 ft/s 3.6 ft/s 4.3 ft/s
Montclair Lift Force Main	18-inch	
San Bernardino Lift Force Main		

3. Asset Ratings *(to be developed in future updates)*

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Archibald Trunk				
Cucamonga Interceptor Relief				
Cucamonga Interceptor				
Cucamonga Relief				
Etiwanda Trunk				
Fontana Interceptor				
Fontana Interceptor Relief				
Freeway Trunk				
Grove Avenue Outfall				
Montclair Interceptor				
Turner Trunk				
Upland Interceptor				
Upland Interceptor Relief				
Montclair Lift Force Main				
San Bernardino Lift Force Main				

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation *(to be developed in future updates)*

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Archibald Trunk	1963	
Cucamonga Interceptor	1973	
Cucamonga Inter. Relief	1987	
Cucamonga Trunk Relief	1983	
Etiwanda Trunk	1986	
Fontana Interceptor		
Fontana Interceptor Relief		
Freeway Trunk	1961	
Grove Avenue Outfall	1961, 2006, 2010	
Grove Interceptor	1961, 2006	
Montclair Interceptor	1975	
Turner Trunk	1969	
Upland Interceptor	1956	
Upland Interceptor Relief	1956, 1991	
Montclair Lift Force Main	1978	
San Bernardino Lift Force Main		

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – RC

Southern Regional Sewer System

1. Asset Profile

The Agency's regional wastewater treatment provides domestic and industrial disposal systems across a 242-square-mile service area to eight contracting agencies. These contracting agencies include the City of Chino, Chino Hills, Cucamonga Valley Water District, Fontana, Montclair, Ontario, Upland, and Monte Vista Water District.

The Regional Sewer System (RSS) conveys primarily domestic wastewater to IEUA's four regional water recycling facilities. The RSS has been separated into two systems and will be referred to in the system summary sheets as the Northern Regional Sewer System and Southern Regional Sewer System. The operation and maintenance of the RSS systems are the responsibility of the IEUA's Pretreatment and Source Control (PT&SC) Department's Collections System Group.

Southern Regional Sewer System

The Southern Regional Sewer System consists of sewer pipelines south of the 60 freeway and RP-1.

Gravity Sewer System:

- Chino Interceptor – 16,059 LF of pipeline from CCWRF to RP-5 and RP-2, consisting of 150 LF of 54-inch piping, 1,933 LF of 42-inch piping, 6,212 LF of 30-inch piping, 1,645 LF of 27-inch piping, and 6,118 LF of 24 piping.
- Eastern Trunk Sewer – 29,321 LF of pipeline from RP-1 connecting to the Kimball Interceptor at Hellman Ave., consisting of 41 LF of 81-inch piping, 30 LF of 67-inch piping, 4,964 LF of 48-inch piping, 10,766 LF of 42-inch piping, 2,246 LF of 39-inch piping, 6,387 LF of 36-inch piping, 4,783 LF of 33-inch piping, and 100 LF of 27-inch piping.
- Kimball Interceptor – 18,923 LF of pipeline from RP-5 east to Hellman Ave., consisting of 2,137 LF of 66-inch piping, 4,809 LF of 60-inch piping, 10,889 of 54-inch piping, and 1,087 LF of 48" piping.
- Los Serranos Trunk – 2,807 LF of pipeline from Pomona Rincon Rd. to El Prado Rd. There are 52 LF of 36" piping and 2,755 LF of 30" piping.
- Westside Interceptor – 23,806 LF of pipeline from Walnut Ave. and Eastend Ave. to Chino Ave. along Pipeline and ending in CCWRF, consisting of 1,297 LF of 24" piping, 10,473 LF of 21" piping, 7,391 LF of 18" piping, 2,719 LF of 15" piping, 1358 LF of 12" piping, and 565 LF of 10" piping.
- Westside Interceptor Relief Sewer – 40,715 LF of pipeline from Montclair diversion structure along Eastend Ave. to Chino Ave, Ramona Ave., Eucalyptus Ave., and Monte Vista Ave. to CCWRF, consisting of 2,575 LF of 54" piping, 4,948 LF of 42" piping, 1,623 LF of 36" piping, 8,803 LF of 33" piping, 1,358 LF of 30" piping, 18,300 of 27" piping, 866 LF of 24" piping, 1,773 LF of 21" piping, and 445 LF of 15" piping.
- CIW/Prado Park Lift Force Main
- RP-2 Lift Station Force Main

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Chino Interceptor	54" – 67.0 MGD 42" – 21.0 MGD 30" – 13.0 MGD 27" – 14.3 MGD 24" – 12.0 MGD	6.0 ft/s 1.8 ft/s 2.3 ft/s 3.3 ft/s 4.0 ft/s
Eastern Trunk Sewer	81" – 194 MGD 67" – X MGD 48" – 47 MGD 42" – 60.3 MGD 39" – 18.4 MGD 36" – 61.7 MGD 33" – 28.8 MGD 27" – 78.4 MGD	6.0 ft/s 6.3 ft/s 6.0 ft/s 6.0 ft/s 6.0 ft/s 6.0 ft/s 6.0 ft/s 6.0 ft/s
Kimball Interceptor	66" – 70.5 MGD 60" – 83.8 MGD 54" – 52.1 MGD 48" – 39.7 MGD	4.7 ft/s 6.3 ft/s 5.2 ft/s 5.6 ft/s
Los Serranos Trunk	36" – 17.9 MGD 30" – 28 MGD	
Westside Interceptor	24" – 7.2 MGD 21" – 7.7 MGD 18" – 5.8 MGD 15" – 4.9 MGD 12" – 1.8 MGD 10" – 2.0 MGD	2.3 ft/s 3.1 ft/s 3.8 ft/s
Westside Interceptor Relief Sewer	54" – 31.9 MGD 42" – 21.7 MGD 36" – 26.6 MGD 33" – 30.2 MGD 30" – 13.6 MGD 27" – 21.0 MGD 24" – 28.2 MGD 21" – 31.6 MGD	2.3 ft/s 2.4 ft/s 3.2 ft/s 4.8 ft/s 2.0 ft/s 3.5 ft/s 6.2 ft/s 2.2 ft/s
CIW/Prado Park Lift		
RP-2 Lift Station Force Main		

3. Asset Ratings *(to be developed in future updates)*

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Chino Interceptor				
Eastern Trunk Sewer				
Kimball Interceptor				
Los Serranos Trunk				
Westside Interceptor				
Westside Interceptor Relief Sewer				
CIW/Prado Park Lift				
RP-2 Lift Station Force Main				

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation *(to be developed in future updates)*

Table 3 History of Select Assets

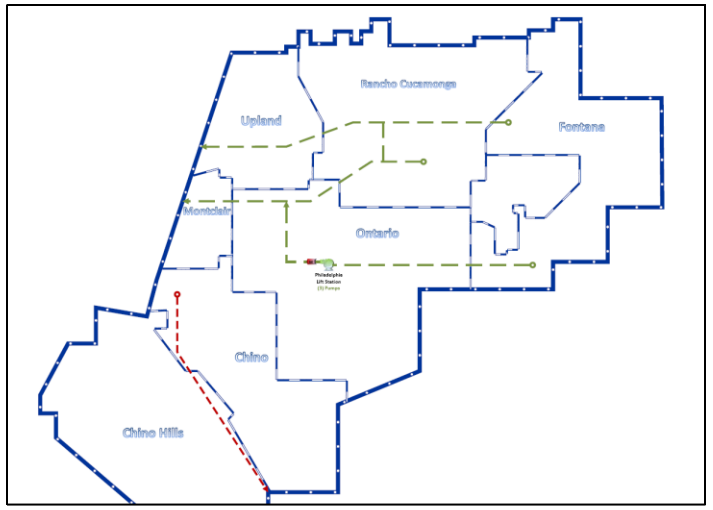
System	Capital Improvement Project Activity	Condition Assessment Report
Chino Interceptor		
Eastern Trunk Sewer		
Kimball Interceptor	1999	
Los Serranos Trunk		
Westside Interceptor		
Westside Interceptor Relief Sewer		
CIW/Prado Park Lift	1964, 1976, 1991, 1998, 2010	
RP-2 Lift Station Force Main		

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

System Summary Continued on Next Page

Asset Management System Summary – RC
Non-Reclaimable Wastewater System
1. Asset Profile



The Agency operates the Non-Reclaimable Wastewater System (NRWS), which provides the disposal means for discharges of high-salt-content industrial wastewater. This wastewater is not suitable to be treated at the Agency's treatment plants. The NRWS transports non-reclaimable, salt-laden, industrial wastewater out of the Agency's service area to other treatment facilities in Los Angeles and Orange counties and to eventual discharge to the Pacific Ocean.

Northern Non-Reclaimable Waste System

- The North NRWS consists of five major trunk lines: the North, Central, and South trunk lines, the Edison Waste Line, and the Cucamonga Creek Trunk. The trunk lines collect industrial waste and convey the combined discharge to the County sanitation districts of Los Angeles County's sewer system.
- North System North Trunk – 22,887 LF of VCP pipeline in Rancho Cucamonga from Day Creek St. and Arrow St. along 8th St. to Hellman Ave.
- North System Center Trunk – 71,343 LF of VCP pipeline starting on Etiwanda Ave. and RP-4 in the City of Ontario running south to Ontario Mills Pkwy., west to Hellman Ave., southwest to Phillips Ave., and west to LACSD.
- North System South Trunk – 65,720 LF of VCP pipeline from Sierra Ave. and Slover Ave. in the City of Fontana to Jurupa Ave., west to Mulberry Ave, south on to Francis St., south on to Etiwanda Ave., and west to Philadelphia Ave to the Philadelphia pump station, where it is connected to the North System Center Trunk by the Philadelphia lift station force main.
- Edison Waste Line – 33,757 LF VCP of pipeline starting from Helms Ave. and 9th St. in Rancho Cucamonga, running south on Hellman Ave., and turning southwest to 5th Ave. in the City of Ontario, and running west along 5th St. to LACSD pipelines.
- Cucamonga Creek Trunk – 8,659 LF VCP of pipeline connecting the Edison Waste Line to the North System Center Trunk along Hellman Ave.
- Philadelphia Lift Force Main – 26,452 LF of two parallel force mains 12-inch and 18-inch VCP pipeline from the Philadelphia Pump Station west on Philadelphia Ave. and north on Bon View Ave. to the North System Center Trunk.

Southern Non-Reclaimable Waste System

The South NRWS serves industries in the south service area of the Agency, and the combined discharge is conveyed to Inland Empire Brine Line (IEBL) and ultimately to the sewer system of the Orange County Sanitation District.

Inland Empire Brine Line – 25,948 LF VCP and RCP of pipeline from Yorba Ave. and Edison Ave. to Monte Vista Ave., with a connection at CCWRF along Chino Creek to El Prado Rd. at Kimball Ave., extending southeast to Euclid Ave. and ultimately to OCSD. There are 15-inch VCP pipelines on Edison Ave., 15-inch VCP on Yorba Ave., 12-inch VCP on Monte Vista St., 27-inch RCP Central Ave/Easement, and 27-inch RCP along El Prado Rd.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
North System North Trunk		
North System Center Trunk		
North System South Trunk	24-inch VCP 8-inch VCP	
Edison Waste Line		
Cucamonga Creek Trunk		
Philadelphia Lift Force Main	18-inch 12-inch	
Inland Empire Brine Line		

3. Asset Ratings *(to be developed in future updates)*

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
North System North Trunk	3	2	2	2
North System Center Trunk				
North System South Trunk				
Edison Waste Line				
Cucamonga Creek Trunk				
Philadelphia Lift Force Main	2	2	2	2
Inland Empire Brine Line	3	3	3	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation *(to be developed in future updates)*

Inland Empire Brine Line

According to the 2006 PBS&J condition assessment report of the IEBL line, 1/3 of the entire pipeline required rehabilitation/replacement, and 1/3 required re-inspection because of inaccessibility. The segments recommended for attention require considerable cleaning to remove debris, which has accumulated within the pipes and may contain hazardous constituents. Inspections were severely hampered by the debris accumulation. Additional inspection for many of the segments is recommended after the cleaning is complete.

Several manholes were found to be surcharged, while the manholes located at the southern-most end of the trunk sewer were inaccessible because of pressure lids.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
North System North Trunk		2006
North System Center Trunk		2006
North System South Trunk		2006
Edison Waste Line		2006
Cucamonga Creek Trunk		2006
Philadelphia Lift Force Main		2006
Inland Empire Brine Line		2006

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

End of System Summary

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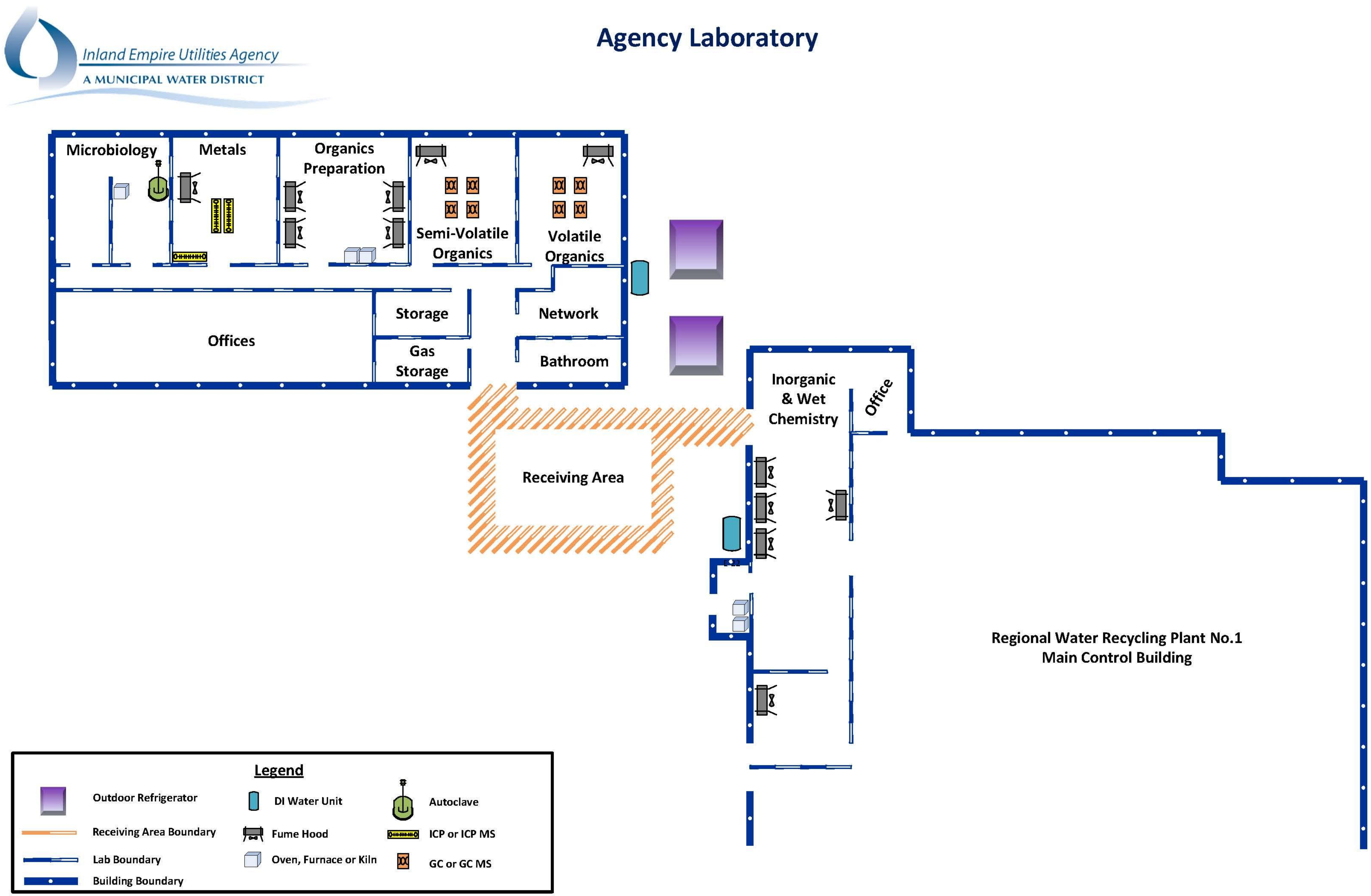

Figure 7-10: Agency Laboratory (Lab) – Schematic

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Table 7-11: Agency Laboratory – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN15008	New Water Quality Laboratory	This project will replace the existing operation laboratory at RP-1. A possible site location will be south of Headquarters at RP-5.	RO	CC	1,530,000	5,950,000	5,950,000	4,250,000	85,000	0	0	0	0	0	17,765,000
2	EN15008	New Water Quality Laboratory (Equipment)	This project will replace the existing operation laboratory at RP-1. A possible site location will be south of Headquarters at RP-5. (Note: new lab equipment LCMS, GCMS, fume hood, Low level Hex. Chromium, perchlorate), additional receiving area for efficiency and chemical storage)	RC	CC	270,000	1,050,000	1,050,000	750,000	15,000	0	0	0	0	0	3,135,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014

(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)

(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

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Asset Management System Summary – Lab

Agency Laboratory

1. Asset Profile

Agency Laboratory (Lab)
The Agency Laboratory (Lab) is located at Regional Water Recycling Plant No.1 in Ontario. The Lab is certified by the California Department of Public Health Environmental Laboratory Accreditation Program (ELAP) to perform 12 fields of testing and 35 specific approved methods. The lab was constructed in two phases: Phase 1 included a 1,900-square-foot laboratory space, and Phase 2 included a 4,300 square-foot-building. The Lab performs more than 80,000 analyses annually and sends out another 5,000 samples for analysis by a contracted laboratory. The Lab is broken into three groups: Wet Chemistry, Metals & Organic Chemistry, and Bioassay & Microbiology. The Lab analyzes samples from the Agency's wastewater plants, pretreatment and source control programs, desalination facility, and ground water recharge basins.

Metals & Organic Chemistry
The Metals & Organic Chemistry section is located in the expanded Phase 2 building. This type of chemistry uses specialized equipment to analyze a sample extract's makeup. Organic Chemistry specifically analyzes substances containing a carbon molecule. Metals/Inorganic Chemistry specifically analyzes substances that don't contain a carbon molecule. Some common analyses include mercury, metal salts, heavy metals, pesticides, and volatile and semi-volatile organics. Key pieces of equipment used are the Inductively Coupled Plasma Spectrometer (ICP), the ICP Mass Spectrometer (ICP MS), the Gas Chromatograph (GC), and GC Mass Spectrometer (GC MS).

Inorganic & Wet Chemistry
The Inorganic and Wet Chemistry section is located in the original Phase 1 building. This type of chemistry includes analyses performed in a liquid phase with beakers, test tubes and solvents. Some common analyses include TOC, BOC, COD, solids (total, dissolved, suspended, and volatile), ammonia, alkalinity, cyanide, and anions.

Microbiology
Microbiology is located in the expanded Phase 2 building. Microbiology is the study of microscopic organisms. Some common analyses include total and fecal coliform and bioassay. Bioassay is a specific scientific experiment that measures the effects of a substance on a living organism (Ceriodaphnia dubia; specie of water flea).

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Average)	Notes
Metals & Organic Chemistry		
Metals:		
Fume Hood	1 @ 100 fpm	Min
ICP	2 @ 157 sample batch	Max
ICP MS	1 unit	
Mercury Analyzer	1 @ 62 sample batch	Max
Auto Block Digester	1 @ 54 sample batch	Max
Peristaltic Pump	2 units	
Organics Preparation:		
Fume Hood	4 @ 100 fpm	Min
Extractor System	3 units; 1 controller	
Kiln	1 @ 450°C	
Oven	1 @ 300°C	
Evaporator	3 @ 300 ml 2 @ 50 or 200 ml	
Dishwasher	2 units	
Semi-Volatile Organics:		
Fume Hood	1 @ 100 fpm	Min
GC	2 @ 25 min per sample	Max
GC MS	2 @ 25 min per sample	Max
Volatile Organics:		
Fume Hood	2 @ 100 fpm	Min
GC	2 units	
Concentrator	2 @ 51 sample batch	Max
Auto Sampler	2 units	
Refrigerator	1 unit	
Gas System:		
Argon	160 liters	
Helium	300 ft^3	
Nitrogen	200 ft^3	
DI Purification	1 unit	
Refrigerator	1 @ 960 ft^3 13 to 41°F	
Inorganic & Wet Chemistry		
Fume Hood	6 @ 100 fpm	Min
Oven	2 @ 180°C 2 @ 104°C	
Furnace	2 @ 550°C	
Incubator	2 @ 20°C	
TOC Analyzer	1 @ 70 sample batch 1 @ 75 sample batch	Max Max
Ion Chromatograph	2 @ 49 sample batch	Max
Colorimeter	1 @ 120 sample batch	Max
Auto Colorimeter	2 unit	
Auto Sampler	2 @ 120 sample batch	Max
Auto Titrator	1 @ 36 sample batch	Max
Nano Pure Filter	1 unit	
Dishwasher	2 units	
Gas System:		
Helium	2 @ 200 ft^3 2 @ 300 ft^3	
Nitrogen	2 @ 300 ft^3	
DI Purification	1 unit	
Refrigerator	1 @ 960 ft^3 13 to 41°F	
Microbiology		
Autoclave	1 @ 35°C 1 @ 120°C	
Incubator	2 @ 35°C	
Water Bath	1 @ 44.5°C	
Oven	2 @ 180°C	
Temp. Control	1 unit	
Nano Pure Filter	1 unit	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Metals & Organic Chemistry	4	4	3	4
Inorganic & Wet Chemistry	4	4	3	4
Microbiology	4	4	3	4

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Metals & Organic Chemistry
The building has ventilation problems and roof leaks. A black dusty and gritty substance covers the counters and expensive lab equipment through all areas. The temperature controls for the building, which are crucial for sensitive lab equipment, fail regularly. The outdoor refrigerator requires routine spare parts, but the structure is sound. Because of constant upgrades of equipment, spare parts become unavailable through the manufacturers. The GC is currently being operated until failure.

The Lab Department will budget for routine replacement of equipment.

Project EN15008 will replace the existing laboratory at RP-1 and replace new lab equipment once the new lab is constructed.

Inorganic & Wet Chemistry
The building has a lack of storage space and problems with roof leaks, and a portion is inadequately protected from weather elements. In addition, there is concern about the effectiveness of the fume hoods. The outdoor refrigerator requires routine spare parts, but the structure is sound (same equipment as above). Because of constant upgrades of equipment, spare parts become unavailable through the manufacturers.

The Lab Department will budget for routine replacement of equipment.

Project EN15008 will replace the existing operation laboratory at RP-1.

Microbiology
Please refer to the Metals & Organic Chemistry discussion under Key Issues related to the building, as Microbiology shares the same building. The autoclave should be replaced every five to ten years; spare parts are used between replacements to ensure continuous operation.

The Lab Department will budget for routine replacement of equipment.

Project EN15008 will replace the existing operation laboratory at RP-1.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Metals & Organic Chemistry	1997	2005
Inorganic & Wet Chemistry	1979	2005
Microbiology	1997	2005

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

End of System Summary

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Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Agency Headquarters

Figure 7-11: Agency Headquarters – Schematic

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Table 7-12: Agency Headquarters – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN13012	Magnolia Channel Monitoring & Maintenance	The Mag Channel will need to be weeded of invasive plant species, and maintain natural native habitat per the Habitat Mitigation and Monitoring Plan (HMMP) for the project. A certified biologist needs to oversee the work, monitor the progress and complete quarterly reports which are then submitted to the regulatory agencies for compliance. Water quality monitoring will also be performed to demonstrate project effectiveness and meet conditions of the grant.	RO	OM	10,000	10,000	10,000	0	0	0	0	0			30,000
2	EN14002	CIPO Enhancements	Construction Management tracking software upgrades.	GG	EQ	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	150,000
3	EN21002	Chino Creek Wetlands and Educational Park Upgrades	Grant dependent project to facilitate the education program and increase community involvement the Park needs three ramadas (pavilions) with educational signage, a restroom/storage facility and the construction of a pervious parking lot with additional signage.	RO	CC	0	0	0	0	0	900,000	958,000	0	0	0	1,858,000
4	TBD	HQ Parking Lot	FY15/16-Remove and Replace 26 concrete stalls, remove and replace trees, and install root barriers.	GG	OM	300,000	0	0	0	250,000	0	0	0	250,000		800,000
5	EN15052	Upgrades to Existing P6 Application	Implementation of P6 ERP Portfolio: Which will include a Management Plan, a step by step procedure to implement the EPS Portfolio, assist agency in EPS Portfolio Implementation, train staff in building project schedules, review schedules against baseline; Train Analyst and Supervisor Staff in maintaining ERP system including EPS security levels, and monthly updates of rolled up individual portfolios into a master portfolio and report writing. Create training materials including step by step contractor schedule review procedures. Project will also include 1 x/month 1 hour training sessions for 12 months and a 2 hour claims management workshop.	GG	CC	100,000	0	0	0	0	0	0	0	0	0	100,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014

(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)

(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

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Asset Management System Summary – HQ

Agency Headquarters and Park

1. Asset Profile

Headquarters

Structures

Two 33,000-square-foot tilt-up-construction single stores contain office space, conference rooms, a board room, and key information system equipment used for agency business functions. Most of the non-wastewater treatment staff uses these two buildings for day-to-day business. The buildings were built to LEED Platinum 2004 certifications by incorporating several eco-friendly sustainable components.

Heating Ventilation and Air Conditioning (HVAC)

The Central Energy Plant serves headquarters buildings A, B, and the RP-5 REEP control room. Each building is air conditioned with a single variable air volume (VAV) air handler with chilled and heated water coils. VAV and VAV with reheat (VAV/R) terminals are pressure independent. Heating is provided by hot water preheat coils in the air handlers and hot water reheat coils in the VAV/R terminals. The REEP control and electrical rooms are air conditioned with constant-volume chilled-water fan coils. There are a total of four chilled water nodes with a connected cooling load of 144.5 tons cooling. Space heating connected load is 590,000 btuh. Hot water is also used for radiant floor heating in the main entrances and locker rooms.

Plumbing

The headquarters facility has traditional plumbing to bathroom fixtures including sinks, showers, toilets, and flushless urinals. Other fixtures include custodian closets and various outdoor hose bibs. Main lines feed hot water from the central plant to the building, where the hot water is used in various heating and cooling aspects of the building. The building is also equipped with a fire suppression system.

Chino Creek Wetlands and Educational Park

The 22-acre park was designed to restore native habitat and natural drainage that feeds into Chino Creek Reach I, showcasing the environmental values of this ecologically rich region of Southern California.

Water Ponds

An aesthetic water feature receives flow from a recycled water service. The ponds hold water and can recirculate for a waterfall feature between the two ponds. The overflow of the ponds flows down a stream to the extended detention basin.

Extended Detention Basin

The detention pond provides initial storage and detention for storm flows. It also serves as a preliminary settling pond for sediments, potentially reducing total suspended solids, and provides the primary storage pool, where flows are conveyed to one of three flow paths: the Surface Flow Wetlands and the Subsurface Flow Wetlands via two stop-log structures. A concrete/rip rap spillway is provided for the 100-year-storm event that would overflow the stop-log structures. The spillway feeds the surface bioswale system.

Surface Wetlands

The Surface Wetlands is a series of several deep water ponds that provide traditional natural system nutrient removal. A combination of emergent vegetation bands and deep and shallow zones provides higher retention time and less hydraulic short-circuiting and supports the microbial processes that result in water quality improvement. The final pond/habitat lake includes dense patches of emergent marsh and open water to provide suitable foraging habitat for water birds. Flow from the habitat lake exits a stop-log structure and flows to the effluent structure.

Subsurface Wetlands

Flow from the detention basin stop-log structure enters three engineered wetland cells. Each cell has a loose pea-gravel soil mixture that supports the root structure of nutrient-removal plant species. The configuration provides high surface area of water flows to the plant root structure for nutrient removal, low potential for hydraulic short-circuiting, and the most potential for highly efficient nutrient removal. Each cell controls the water level via a stop-log structure.

Bioswale

The bioswale system receives overflow from the extended detention basin and directs flow to the effluent structure. The bioswale has several energy-dissipation and soil-stabilization components, including planted willows, mulefat, geotextile soil fabric, rip rap, and a large stabilized tree root bole.

Intermittent Stream

The intermittent stream on the west side of the site conveys infrequent storm flows, providing preliminary water quality treatment, and consists of drier riparian habitats. Upland woodland and grassland areas provide aesthetically pleasing areas for visitors to walk through and picnic, while demonstrating upland habitats historically common in many hillsides and valleys. The effluent flow from this system flows into the effluent structure.

Effluent Structure

The concrete effluent structure receives surface flow from the intermittent-stream and swale system and bioswale system and receives piped flow from the Habitat Lake. The combined flow then flows south to the RP-5 Santa Ana River Outfall, where it follows the existing waterways.

Education

The purposes of the wetlands are to demonstrate natural-water treatment and upland habitats. The Agency encourages educational awareness through interactive trails with informational signage throughout the park, an information center, scheduled tours, the distribution of educational pamphlets and materials, and presentations to local/regional schools The education and informational stations focus on different water and wetlands themes. Station examples include water testing, microscopic pond life viewing, and bird watching. Some stations consist of large obsolete wastewater treatment plant equipment that has been modified and placed in the park to serve as an elevated lookout platform; visual volume references; and shade structure. There is appropriate signage for each station.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Dry Weather Average)	Notes
Headquarters	14 acres	
Structures	2 at 33,000 sq ft ea. 194 Office spaces 11 Conference Rooms 7 kitchens	
HVAC	144.5 cooling tons 590,000 btuh space heating	
Plumbing	35 toilets 12 urinals 33 sinks 9 showers	
Chino Creek Park	22 acres	
Water Ponds	2 pumps @ 350 gpm	
Extended Detention Basin	3.1 acre-ft	Volume
Surface Wetlands	7.3 acre-ft	Volume
Subsurface Wetlands Pea Gravel	3 cells Approx. 170 ft by 40 ft 2.5 ft depth	Each
Bio swale	700 LF	
Intermittent Stream	1300LF	
Effluent Structure	20 ft x 8 ft x 6 ft	Vault
Education Stations Trails	 11 stations 1.7 miles	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
Headquarters				
Structures	4	3	3	3
HVAC	4	3	3	4
Plumbing	3	3	3	3
Chino Creek Park				
Water Ponds	3	3	3	3
Extended Detention Basin	4	3	3	4
Surface Wetlands	3	3	3	3
Subsurface Wetlands	4	3	3	3
Bioswale	2	3	3	3
Intermittent Stream	3	3	3	3
Effluent Structure	2	3	3	3
Education	3	3	4	3

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

Headquarters

Structures

Cracks have been observed on the walls and parking spaces, indicating differential settling of the ground under the headquarters complex. A potential project will evaluate the extent of the settling to address its impacts.

Heating Ventilation and Air Conditioning (HVAC)

The Central Energy Plant has limited backup equipment and is undersized for future expected uses, specifically the future Central Lab project. Since the recent rehab, the Central Plant is still having issues, so a condition assessment is needed to identify potential solutions.

A potential project is needed upgrade controls, add backup equipment and expand process required for future uses.

Plumbing

Last year the fire-suppression-system piping broke, flooding a large portion of the headquarters office space. The failure was caused by excessive corrosion. Maintenance has a project to evaluate the condition of all the piping at the headquarters complex. Recent vandalism and theft has resulted in equipment being stolen from the Agency property.

Chino Creek Wetlands and Educational Park

Extended Detention Basin

Soil erosion has been observed on several slopes of the extended detention basin from storm water runoff. Engineering is working on projects to protect the slopes from further erosion.

Education

The park currently has limited use for school field trips and outreach because of the lack of shaded areas and permanent restroom facilities.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
Headquarters		
Structures	2003	2013
HVAC	2003	Planned 2015
Plumbing	2003	
Chino Creek Park		
Water Ponds	2003	
Extended Detention Basin	2007	
Surface Wetlands	2007	
Subsurface Wetlands	2007	
Bioswale	2007	
Intermittent Stream	2007	
Effluent Structure	2007	
Education	2007	

Table 4 Potential Projects

System	Project Name	Project Description
HQ Structures	HQ Parking Lot	Remove and Replace 26 concrete stalls, remove and replace trees, and install root barriers.
HQ HVAC	Central Energy Plant HVAC	Upgrade controls, add backup equipment and expand process required for future uses
HQ Plumbing	HQ Vandalism and Theft Deterrent Improvements	Provide cages, additional lighting and upgrades to discourage vandalism and theft of the external fixtures at the Agency Headquarters.

End of System Summary

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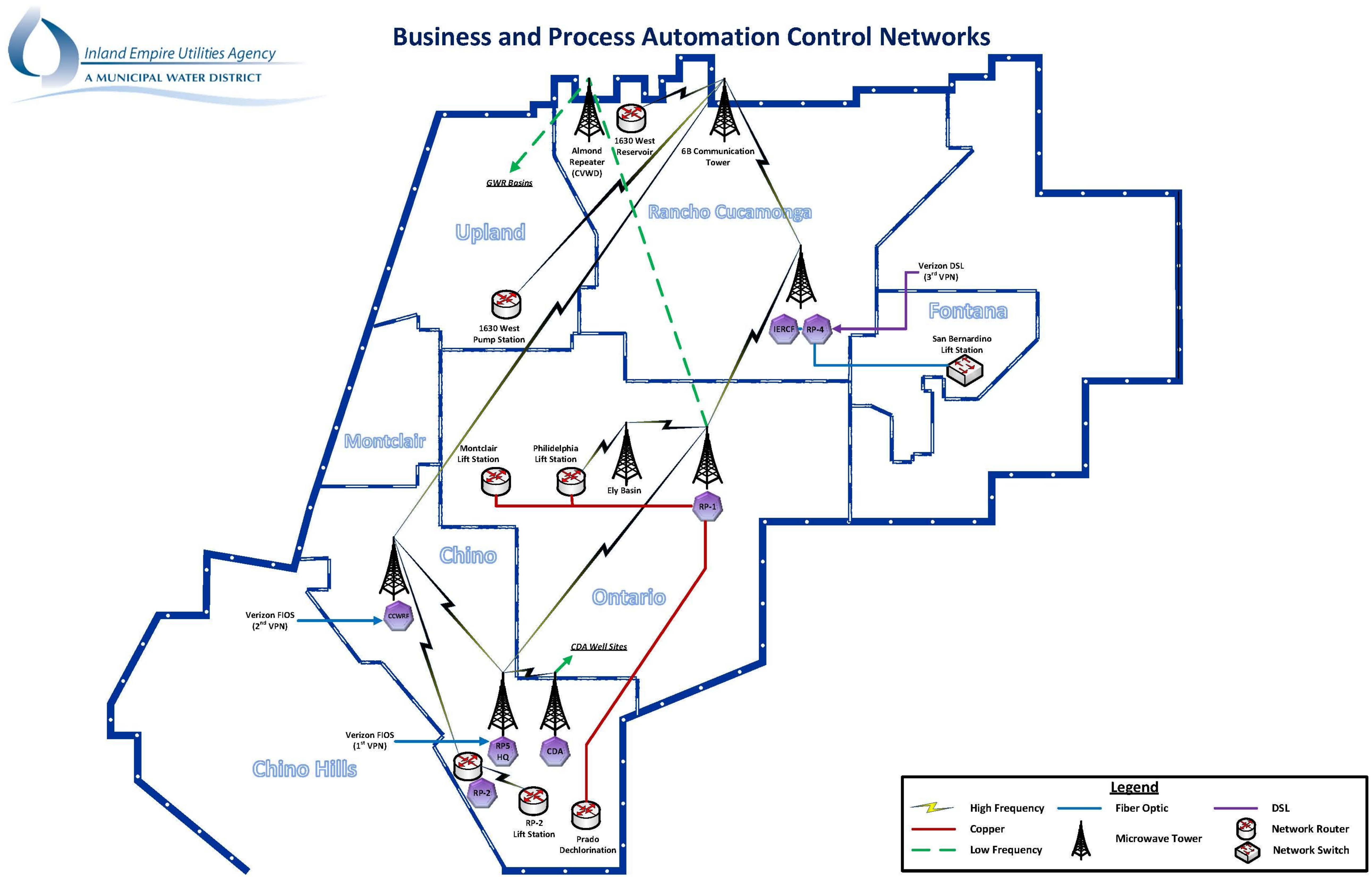

Figure 7-12: Business (BIZ) & Process Automation Control (PAC) Networks – Schematic

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Table 7-13: Business Network and Process Automation Control Network – Project Summary

#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
1	EN13016	SCADA Enterprise System	SCADA Enterprise System. Replacing the DCS over the next five years.	RO	CC	4,200,000	1,000,000	3,000,000	500,000	0	0	0	0	0	0	8,700,000
2	EN13040	Prado Dechlor Communication System	Installation of a monopole, radios, microwave dishes, communications panel and other equipment to allow the station to effectively communicate with the rest of the IEUA network.	WC	CC	181,735	0	0	0	0	0	0	0	0	0	181,735
3	EN13042	Philadelphia Pump Station Communication System	Installation of a monopole, radios, microwave dishes, communications panel and other equipment to allow the station to effectively communicate with the rest of the IEUA network.	NC	CC	200,000	0	0	0	0	0	0	0	0	0	200,000
4	EN13043	Montclair Lift Station Communication System	Installation of a monopole, radios, microwave dishes, communications panel and other equipment to allow the station to effectively communicate with the rest of the IEUA network.	RC	CC	165,000	370,000	0	0	0	0	0	0	0	0	535,000
5	IS15001	HCM Phase 2 HR Process & Automation & ESS/MSS Enhancements	HCM Phase 2 HR Process & Automation & ESS/MSS Enhancements	GG	EQ	50,000	50,000	100,000	0	0	0	0	0	0	0	200,000
6	IS15003	Document Management System - Implementation	Document Management System - Implementation	GG	EQ	250,000	100,000	50,000	0	0	0	0	0	0	0	400,000
7	IS15012	Business Network IT Improvements (TMP)	Annual business network improvements	GG	RP	1,100,000	100,000	100,000	100,000	200,000	200,000	200,000	200,000	200,000	200,000	2,600,000
8	IS15015	PAC- L55 Processor Replacement / Redundancy Modules	Replace ethernet (EN2T) North/South (2 year project)	RO	RP	45,000	0	0	0	0	0	0	0	0	0	45,000
9	IS15020	Process Automation Controls IT Improvements	Annual PAC network improvements.	RO	RP	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	3,000,000
10	IS16001	HCM Phase 2 Position Budgeting & Control	HCM Phase 2 Position Budgeting & Control	GG	EQ	0		206,000	0	0	0	0	0	0	0	206,000
11	IS16003	SAP Archiving	SAP Archiving	GG	EQ	0	0	50,000	0	0	0	0	0	0	0	50,000
12	TBD	SAP User Interface Improvement	Implementation of User Interface (UI) technologies that address the ease-of-use and mobility needs (e.g., FIORI and Persona)	GG	CC	125,000	100,000	0	0	0	0	0	0	0	0	225,000

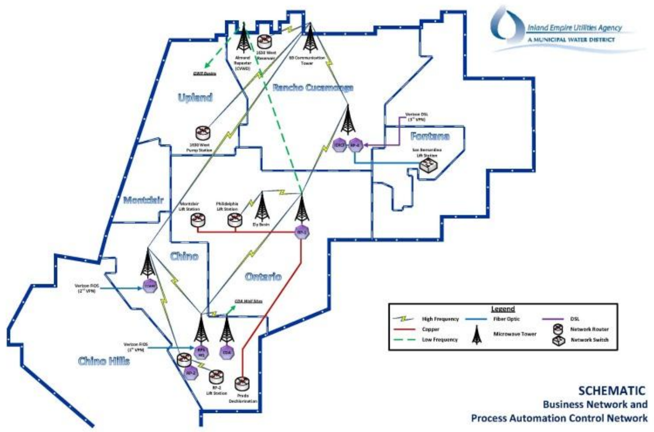
#	Project Number[1]	Project Name	Project Description	Fund[2]	Project Type[3]	Fiscal Year Budget (Dollars)										
						15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	Ten-Year Total
13	TBD	GIS Master Plan (TMP)		GG	OM	0	50,000	0	0	0	0	0	0	0	0	50,000
14	TBD	SAP Strategy and Roadmap (TMP)	For various enterprise systems improvements (SAP HANA in FY19, SAP Cloud in FY18) From TMP	GG	CC	300,000	300,000	300,000	300,000	400,000	250,000	250,000	250,000	250,000	250,000	2,850,000
15	TBD	Conference Rooms AV (Agencywide)	Upgrade the Audio/Video equipment in the conference rooms.	GG	RP	100,000	100,000	100,000	100,000	0	0	0	0	0	0	400,000
16	TBD	IS Improvement Projects (TMP)	Placeholder for SAP projects as identified through TMP process	GG	RP	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	2,000,000

(1) Project Number – from Ten-Year Capital Improvement Project; Final Capital Project List 03-17-2014
(2) Project Fund – Administrative Services (GG), Non-Reclaimed Water (NC), Regional Composting Authority (RM), Ground Water Recharge (RW), Recycled Water (WC), Regional Capital (RC), Regional O&M (RO), or Water Fund (WW)
(3) Project Type – Capital Construction Project (CC), Capital Major Equipment Project (EQ), Operations & Maintenance Project (OM), Reimbursable Project (RE), or Capital Replacement Project (RP)

Asset Management System Summary – BIZ/PAC

Business & Process Automation Control Networks

1. Asset Profile



Business Network

The Business Network (BIZ) is an Agency network that connects local area business networks throughout the Agency together through the use of a wireless Wide Area Network (WAN) and provides access to the internet. Communication within the network is transmitted through cable media and wireless media. The wireless media communication supports the BIZ and Process Automation & Control (PAC) systems. BIZ provides the shared use of business-related resources, such as storage servers, printers, email, and interpersonal communications. The BIZ is composed of servers located at the Headquarters Buildings, RP-1, and RP-5. Network switches connect each networked asset to the BIZ network. There are two sets of assets included in the BIZ: productivity tools and fixed assets.

Process Automation & Control (PAC)

The Process Automation & Control System (PAC) is an Agency network that connects local area process automation networks together through a wireless Wide Area Network (WAN). The communications within the networks are transmitted through cable media and wireless media. A series of microwave transmitting towers creates a loop of wireless communication linking all the facilities. The primary communication towers are located at RP-1, CCWRF, RP-4, RP-5, and the Northwest 6B Tower. Cucamonga Valley Water District's Almond Street Repeater provides communication and control of the ground water recharge basins. Network switches connect PLCs, operator work stations, and other network devices connected to the PAC network. An operator is able to log on the PAC network to control and monitor a facility using the Supervisory Control and Data Acquisition (SCADA) system or Distributed Control System (DCS) system.

The SCADA systems are composed of Rockwell Automation software and Allen Bradley PLCs. The DCS systems use the Foxboro DCS system from Invensys and a combination of Invensys Control Processors and Allen Bradley PLCs. Field output data is transmitted to either a PLC or a centralized control processor, and the SCADA/DCS systems provide a single platform to monitor all the field data, make set point changes, establish/monitor alarm conditions, and control equipment within an entire facility. Field data is also transmitted to a historian, that is, a storage server, to allow trending or analytical analysis in the future.

There are two sets of assets included in the PAC: productivity tools and other fixed assets.

2. Capacity Profile

Table 1 Capacity by System

System Subsystem(s)	Design Capacity (Average)	Notes
BIZ – Productivity Tools A/V Equipment Cell Phone Camera Mobile Hot Spot Monitor Printer Scanner Tablet Workstation	 14 units 76 units 18 units 55 units 660 units 125 units 21 units 23 units 300 units	
BIZ – Fixed Assets Server HyperV Server VMware UPS Network Switch	 12 units 50 units 11 units 4 units 90 units	
PAC – Productivity Tools Tablet Workstation	 25 units 50 units	
PAC – Fixed Assets Microwave IEUA CVWD DCS System SCADA System Server HyperV Server VMware UPS Network Switch PLC OIT	 5 units 1 unit 4 units 4 units 3 units 49 units 15 units 88 units 120 units 250 units 140 units	

3. Asset Ratings

Table 2 Asset Ratings

System	Rating Scale* 1 = Excellent; 5 = Poor			
	Condition	Redundancy	Function	Reliability
BIZ – Productivity Tools	3	3	3	3
BIZ – Fixed Assets	3	3	3	3
PAC – Productivity Tools	3	3	3	3
PAC – Fixed Assets	4	4	3	4

* Ratings as defined in Appendix A

4. Key Issues for Further Investigation

BIZ and PAC Networks

Assets are replaced based on product lifecycle. A technology consultant is evaluating the BIZ and PAC networks to analyze potential hardware and software upgrades; Project IS15012.

Equipment replacement lifecycle: PLC (12 years), UPS (10 years), Workstation (4 years), OIT (10 years), server (5 years), I/O (15 years), Printer (10 years), network switches (10 years), and software licenses are typically renewed annually.

BIZ – Productivity Tools

Maintenance projects related to equipment replacement based on the product's lifecycle will be budgeted in the Department's budget for routine replacement and rehab of assets.

BIZ – Fixed Assets

Maintenance projects related to equipment replacement based on the product's lifecycle will be budgeted in the Department's budget for routine replacement and rehab of assets.

PAC – Productivity Tools

Maintenance will be budgeted in the Department's budget for routine replacement and rehab of assets.

PAC – Fixed Assets

Maintenance projects related to equipment replacement based on the product's lifecycle will be budgeted in the Department's budget for routine replacement and rehab of assets. Project IS15020 will improve the network annually.

To improve communication new monopoles, radios, and microwaves are being installed under Project EN13040, EN13042, and EN13043.

DCS software and associated hardware need to be updated. Currently the Agency operates two different SCADA systems; it is the Agency's goal to transition to Allen Bradley PLC driven control. Project EN13016 will replace the current DCS system.

Table 3 History of Select Assets

System	Capital Improvement Project Activity	Condition Assessment Report
BIZ – Productivity Tools		
BIZ – Fixed Assets		
PAC – Microwave Towers		
PAC – Fixed Assets		

Table 4 Potential Projects

System	Project Name	Project Description
NA	NA	NA

End of System Summary

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Appendix A: Asset Ratings

Definitions of the ratings for each of the Failure Modes

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Table A-1 Condition Rating

Rating	Description
1	New or Excellent Condition
2	Minor Defects Only
3	Moderate Deterioration (Does not require immediate action)
4	Significant Deterioration
5	Virtually Unserviceable

The rating is intended to show the degree of deterioration to structures and equipment.

Table A-2 Redundancy Rating

Rating	Description
1	High level of redundancy – treatment process is not impacted by multiple units being out of service
2	Significant level of redundancy – treatment process is not impacted by one unit being out of service for an extended period of time
3	Adequate level of redundancy – treatment process is not impacted by one unit being out of service
4	Inadequate level of redundancy – treatment process is negatively impacted by one unit being out of service
5	No redundancy – intended process function cannot be achieved when asset is out of service

The rating is intended to show the impact to the treatment process when the asset in question is out of service.

Table A-3 Function Rating

Rating	Description
1	Exceeds all Functional Requirements
2	Exceeds some Functional Requirements
3	Meets all Functional Requirements
4	Fails some Functional Requirements
5	Fails all Functional Requirements

The rating is the ability for the asset to meet the functional requirements that allow performance targets to be met.

Table A-4 Reliability Rating

Rating	Description
1	Frequency of failure is significantly lower than expected
2	Frequency of failure is lower than expected
3	Frequency of failure is consistent with design expectations
4	Frequency of failure is higher than expected
5	Frequency of failure is significantly higher than expected

The rating is intended to show the tendency for the asset to experience a failure.

Appendix B: Electrical Single Line Diagrams

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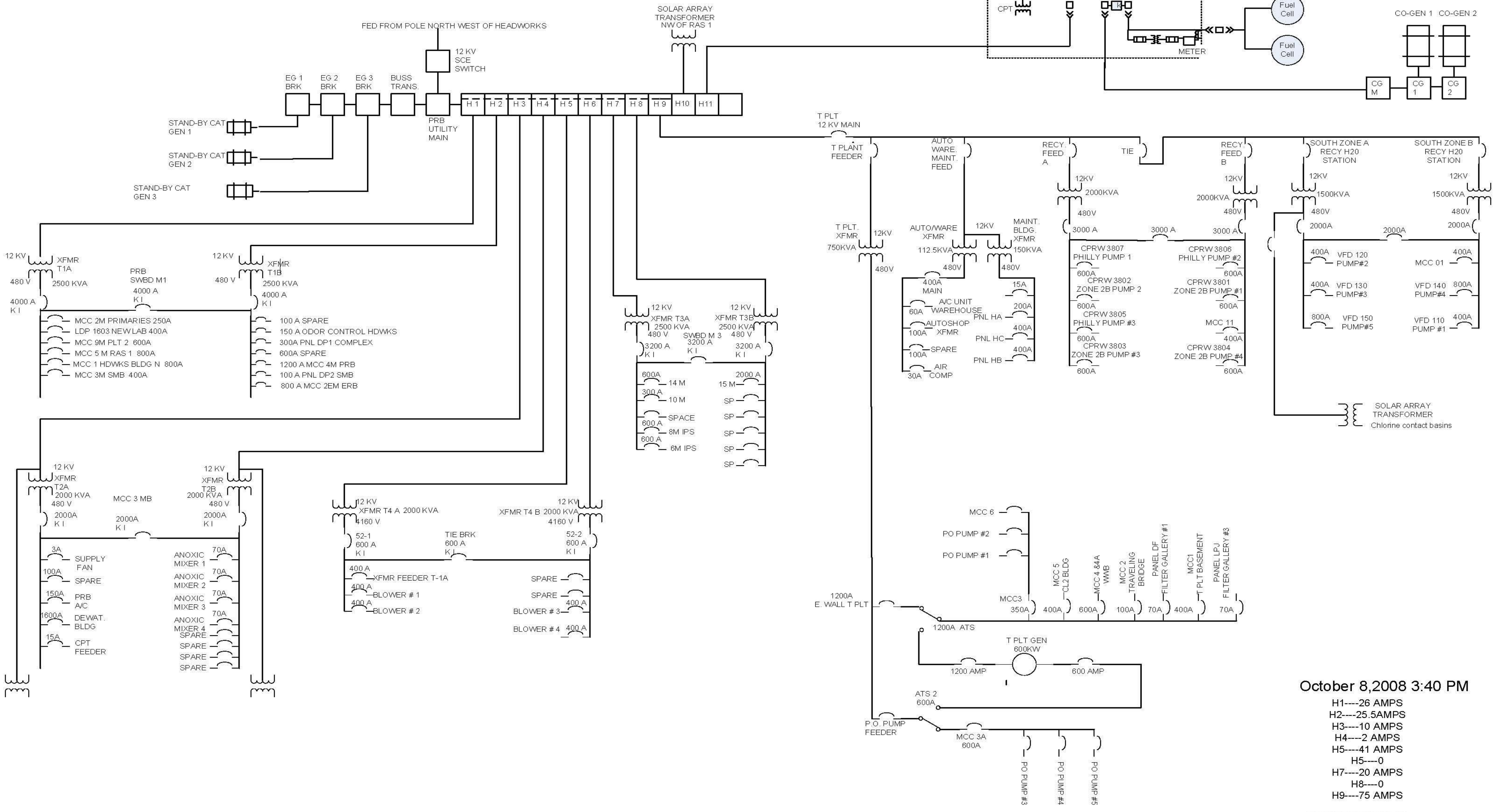
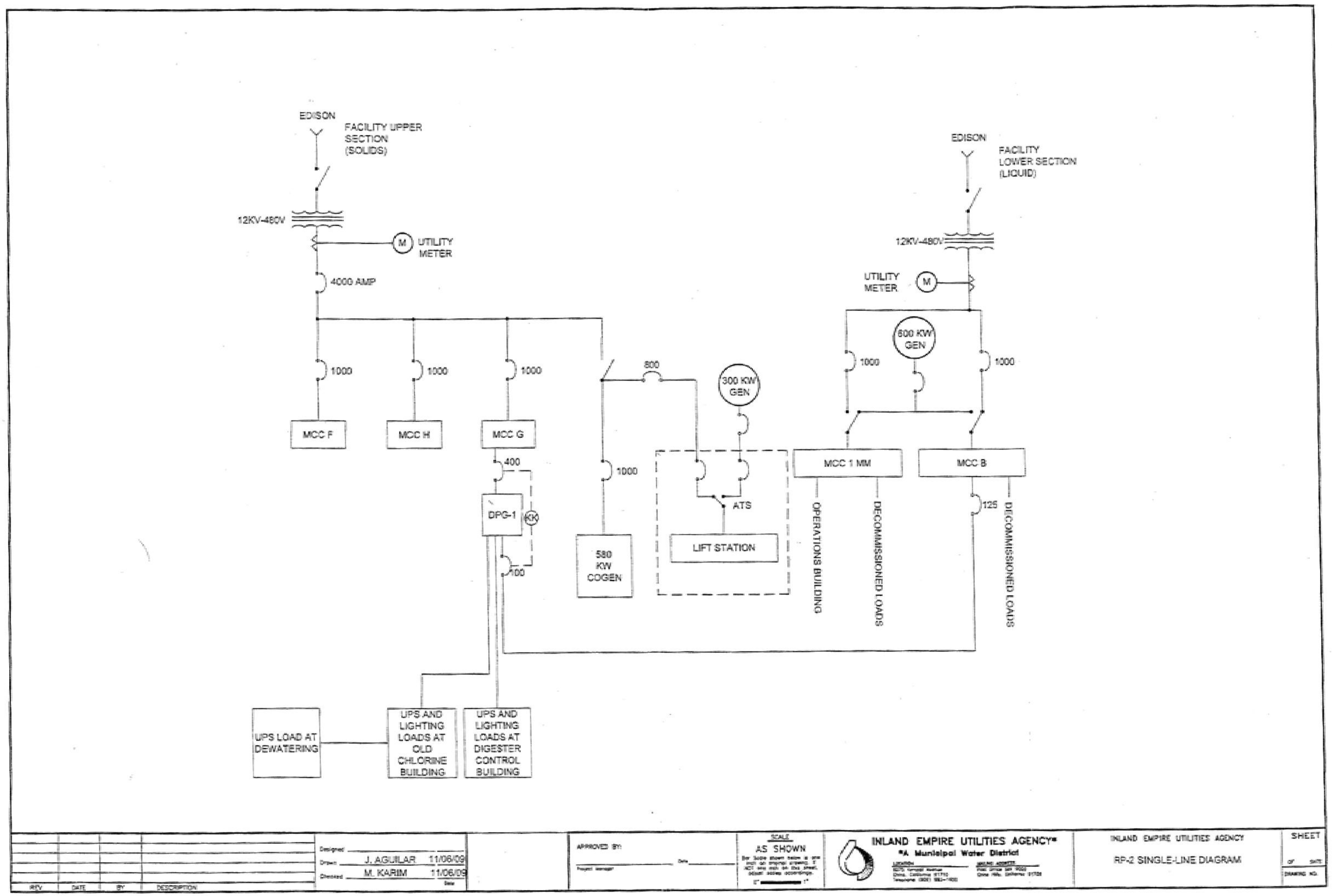
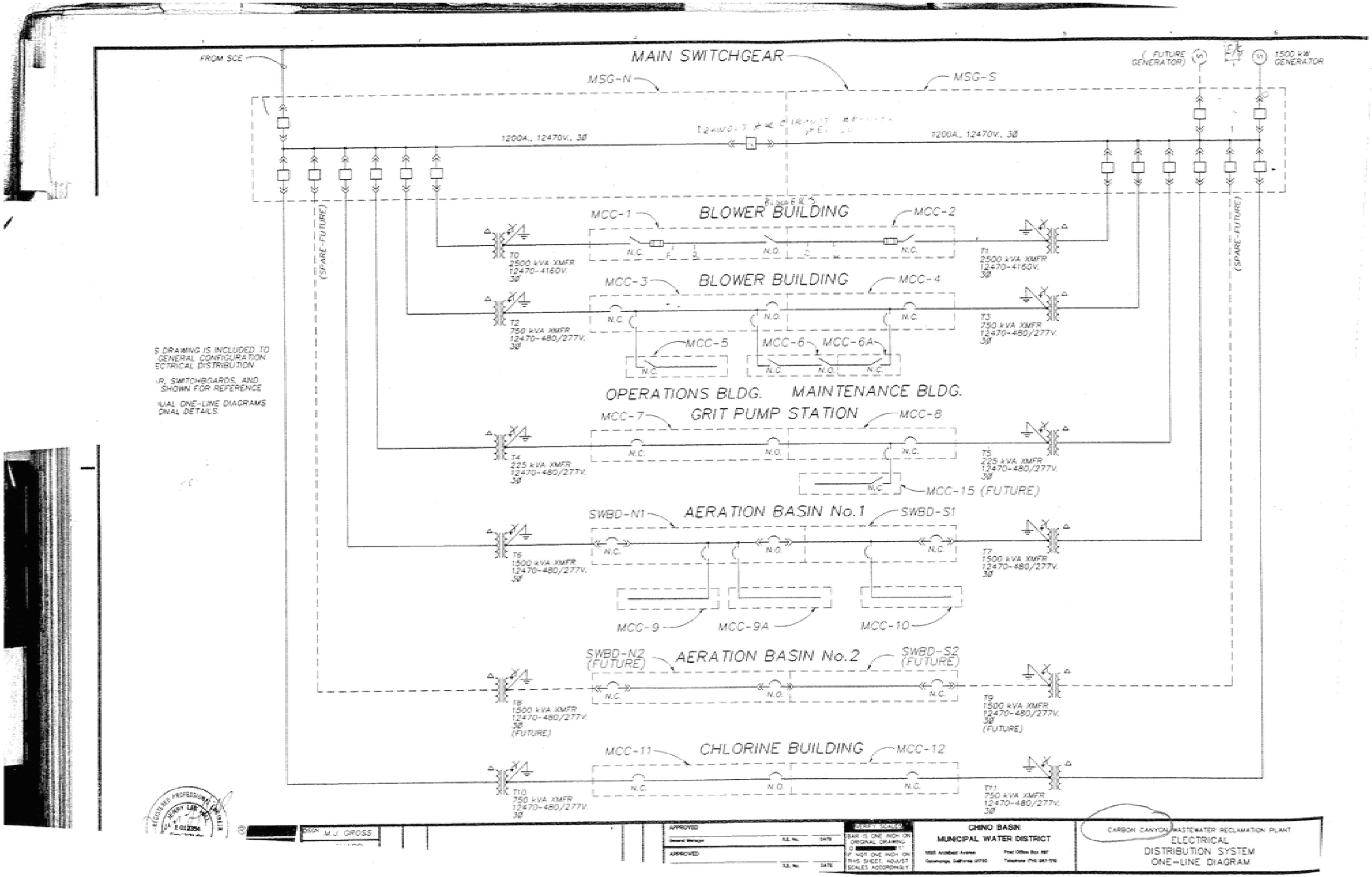
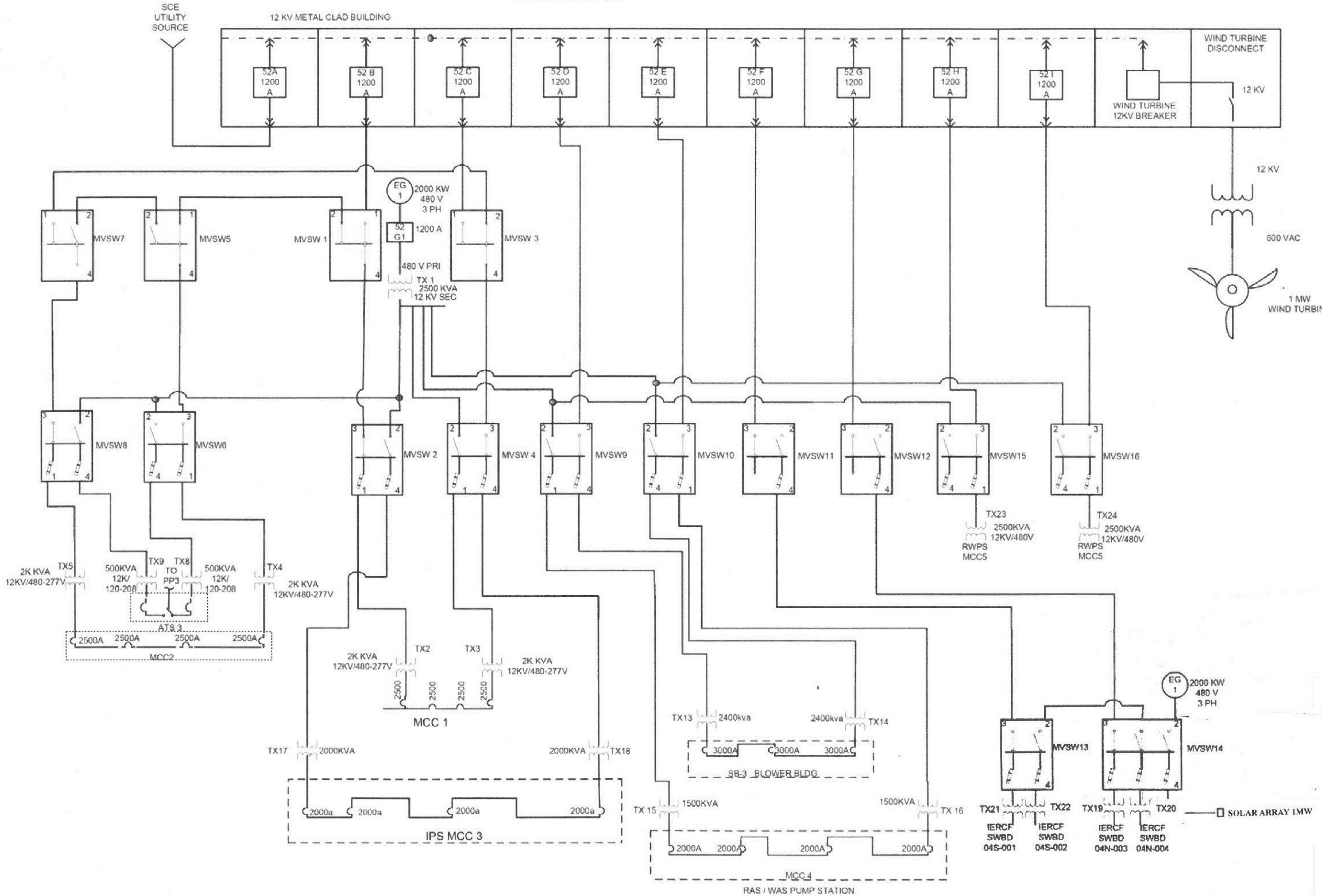
RP 1 PRIMARY FEED LAYOUT AS OF DECEMBER 2012

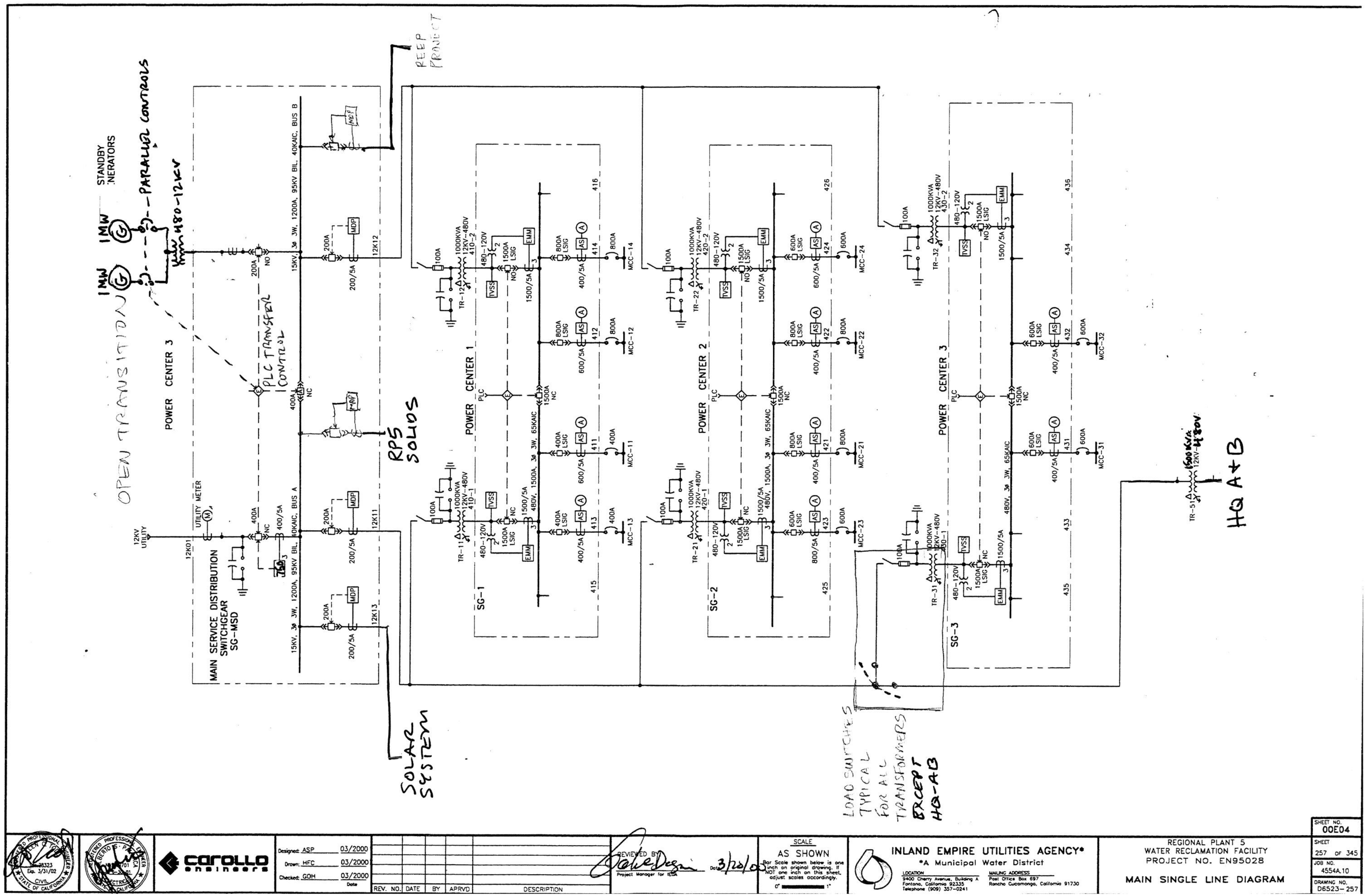


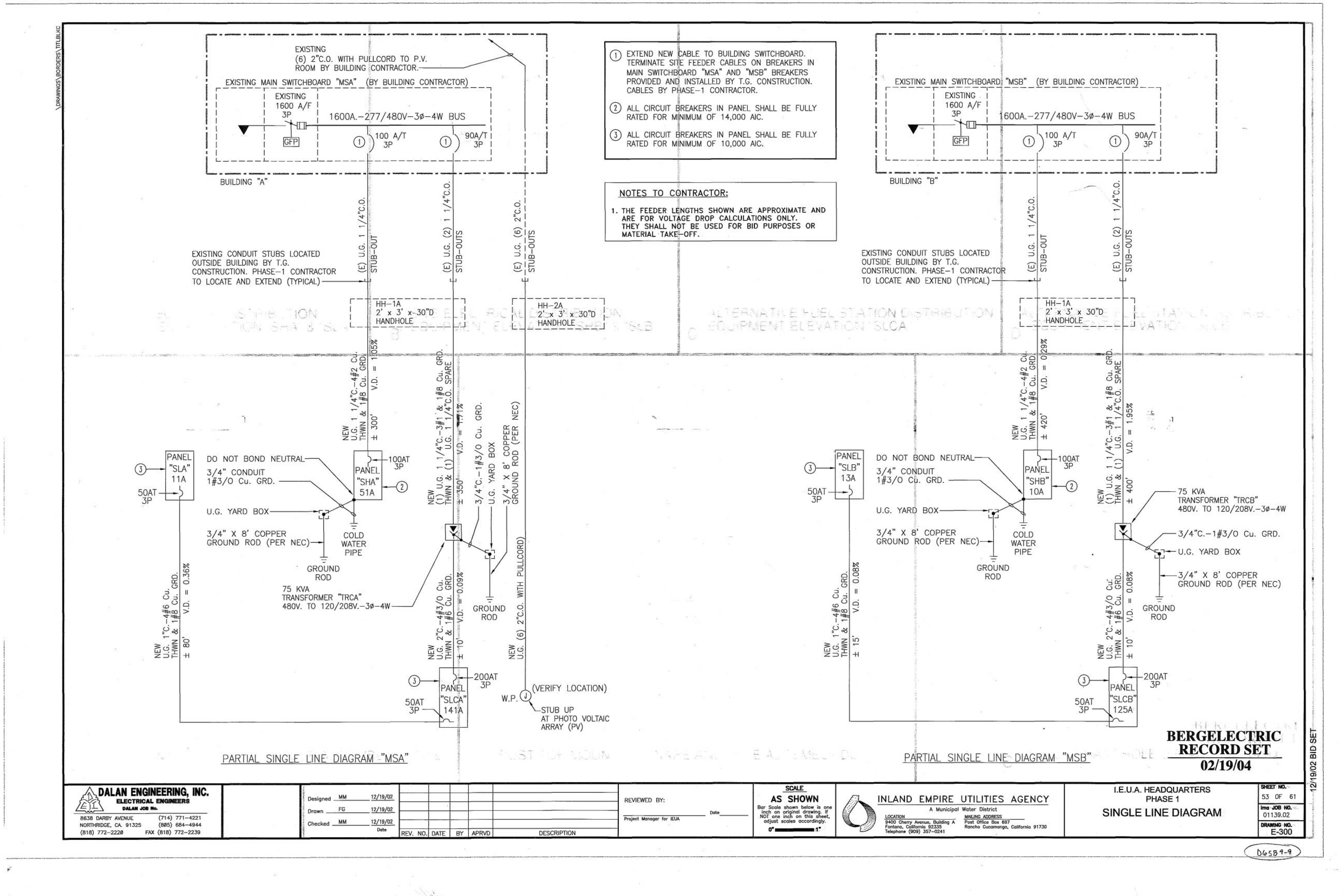

EDISON
FACILITY UPPER SECTION (SOLIDS)
12KV-480V
UTILITY METER
4000 AMP
1000
1000
1000
800
MCC F
MCC H
MCC G
400
DPG-1
KK
100
1000
580 KW COGEN
300 KW GEN
ATS
LIFT STATION
EDISON
FACILITY LOWER SECTION (LIQUID)
12KV-480V
UTILITY METER
600 KW GEN
1000
1000
MCC 1 MM
MCC B
125
OPERATIONS BUILDING
DECOMMISSIONED LOADS
DECOMMISSIONED LOADS
UPS LOAD AT DEWATERING
UPS AND LIGHTING LOADS AT OLD CHLORINE BUILDING
UPS AND LIGHTING LOADS AT DIGESTER CONTROL BUILDING
REV DATE BY DESCRIPTION
Designed
Drawn J. AGUILAR 11/06/09
Checked M. KARIM 11/06/09
APPROVED BY:
SCALE AS SHOWN
INLAND EMPIRE UTILITIES AGENCY*
*A Municipal Water District
INLAND EMPIRE UTILITIES AGENCY
RP-2 SINGLE-LINE DIAGRAM
SHEET

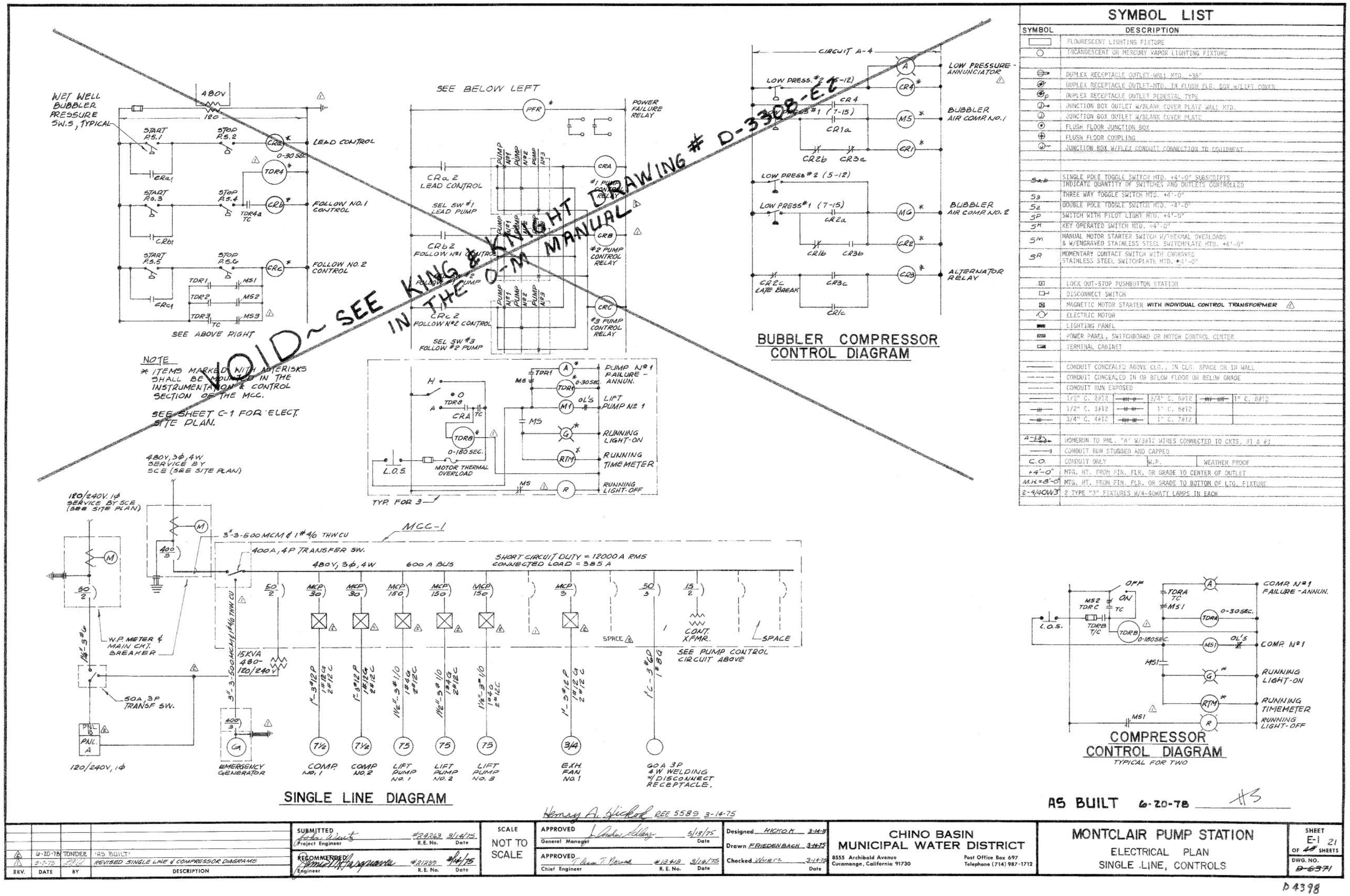

MAIN SWITCHGEAR
FROM SCE
MSG-N
MSG-S
1200A., 12470V., 3Ø
FUTURE GENERATOR
1500 kW GENERATOR
MCC-1
BLOWER BUILDING
MCC-2
T0 2500 kVA XMFR 12470-4160V. 3Ø
T1 2500 kVA XMFR 12470-4160V. 3Ø
(SPARE-FUTURE)
MCC-3
BLOWER BUILDING
MCC-4
T2 750 kVA XMFR 12470-480/277V. 3Ø
T3 750 kVA XMFR 12470-480/277V. 3Ø
MCC-5
MCC-6
MCC-6A
OPERATIONS BLDG.
MAINTENANCE BLDG.
MCC-7
GRIT PUMP STATION
MCC-8
T4 225 kVA XMFR 12470-480/277V. 3Ø
T5 225 kVA XMFR 12470-480/277V. 3Ø
MCC-15 (FUTURE)
SWBD-N1
AERATION BASIN No.1
SWBD-S1
T6 1500 kVA XMFR 12470-480/277V. 3Ø
T7 1500 kVA XMFR 12470-480/277V. 3Ø
MCC-9
MCC-9A
MCC-10
SWBD-N2 (FUTURE)
AERATION BASIN No.2
SWBD-S2 (FUTURE)
T8 1500 kVA XMFR 12470-480/277V. 3Ø (FUTURE)
T9 1500 kVA XMFR 12470-480/277V. 3Ø (FUTURE)
MCC-11
CHLORINE BUILDING
MCC-12
T10 750 kVA XMFR 12470-480/277V. 3Ø
T11 750 kVA XMFR 12470-480/277V. 3Ø
M.J. GROSS
CHINO BASIN MUNICIPAL WATER DISTRICT
CARBON CANYON WASTEWATER RECLAMATION PLANT
ELECTRICAL DISTRIBUTION SYSTEM ONE-LINE DIAGRAM

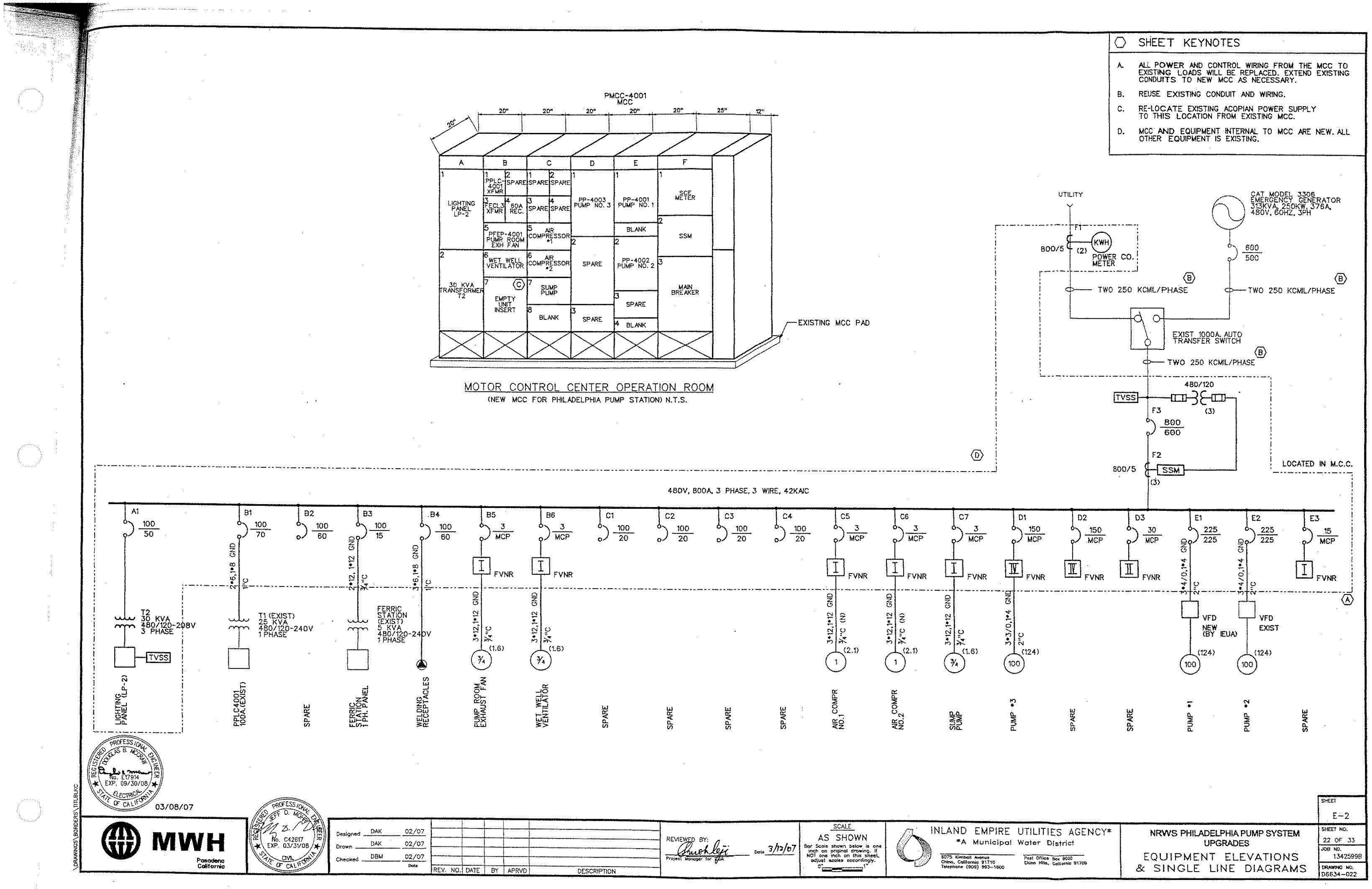
RP 4 12 KV
SINGLE LINE

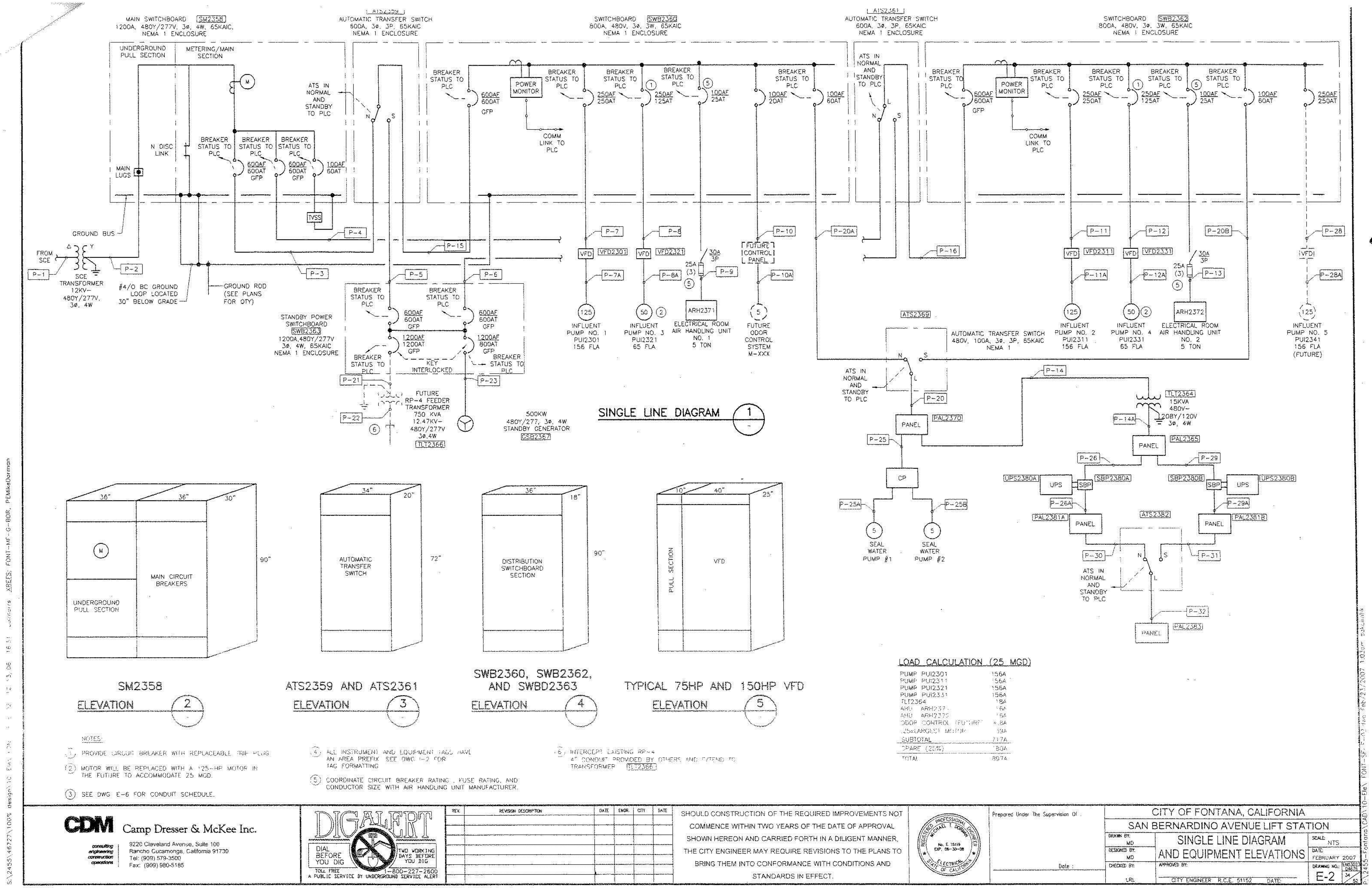



INLAND EMPIRE UTILITIES AGENCY*
*A Municipal Water District
REGIONAL PLANT 5
WATER RECLAMATION FACILITY
PROJECT NO. EN95028
MAIN SINGLE LINE DIAGRAM
AS SHOWN
00E04
257 OF 345
4554A.10
D6523-257


EXISTING
(6) 2"C.O. WITH PULLCORD TO P.V. ROOM BY BUILDING CONTRACTOR.
EXISTING MAIN SWITCHBOARD "MSA" (BY BUILDING CONTRACTOR)
EXISTING 1600 A/F 3P
GFP
1600A.-277/480V-3ø-4W BUS
100 A/T 3P
90A/T 3P
BUILDING "A"
1 EXTEND NEW CABLE TO BUILDING SWITCHBOARD. TERMINATE SITE FEEDER CABLES ON BREAKERS IN MAIN SWITCHBOARD "MSA" AND "MSB" BREAKERS PROVIDED AND INSTALLED BY T.G. CONSTRUCTION. CABLES BY PHASE-1 CONTRACTOR.
2 ALL CIRCUIT BREAKERS IN PANEL SHALL BE FULLY RATED FOR MINIMUM OF 14,000 AIC.
3 ALL CIRCUIT BREAKERS IN PANEL SHALL BE FULLY RATED FOR MINIMUM OF 10,000 AIC.
NOTES TO CONTRACTOR:
1. THE FEEDER LENGTHS SHOWN ARE APPROXIMATE AND ARE FOR VOLTAGE DROP CALCULATIONS ONLY. THEY SHALL NOT BE USED FOR BID PURPOSES OR MATERIAL TAKE-OFF.
EXISTING MAIN SWITCHBOARD "MSB" (BY BUILDING CONTRACTOR)
BUILDING "B"
EXISTING CONDUIT STUBS LOCATED OUTSIDE BUILDING BY T.G. CONSTRUCTION. PHASE-1 CONTRACTOR TO LOCATE AND EXTEND (TYPICAL)
(E) U.G. 1 1/4"C.O. STUB-OUT
(E) U.G. (2) 1 1/4"C.O. STUB-OUTS
(E) U.G. (6) 2"C.O. STUB-OUTS
HH-1A 2' x 3' x-30"D HANDHOLE
HH-2A 2' x 3' x 30"D HANDHOLE
NEW U.G. 1 1/4"C.-4#2 Cu. THWN & 1#8 Cu. GRD. ± 300' V.D. = 1.05%
NEW (1) U.G. 1 1/4"C.-3#1 & 1#8 Cu. GRD. THWN & (1) U.G. 1 1/4"C.O. SPARE ± 350' V.D. = 1.71%
3/4"C.-1#3/0 Cu. GRD.
U.G. YARD BOX
3/4" X 8' COPPER GROUND ROD (PER NEC)
PANEL "SLA" 11A
50AT 3P
DO NOT BOND NEUTRAL
3/4" CONDUIT 1#3/0 Cu. GRD.
PANEL "SHA" 51A
100AT 3P
COLD WATER PIPE
GROUND ROD
75 KVA TRANSFORMER "TRCA" 480V. TO 120/208V.-3ø-4W
NEW U.G. 1"C.-4#6 Cu. THWN & 1#8 Cu. GRD. ± 80' V.D. = 0.36%
NEW U.G. 2"C.-4#3/0 Cu. THWN & 1#6 Cu. GRD. ± 10' V.D. = 0.09%
NEW U.G. (6) 2"C.O. WITH PULLCORD
PANEL "SLCA" 141A
200AT 3P
W.P.
(VERIFY LOCATION)
STUB UP AT PHOTO VOLTAIC ARRAY (PV)
PARTIAL SINGLE LINE DIAGRAM "MSA"
NEW U.G. 1 1/4"C.-4#2 Cu. THWN & 1#8 Cu. GRD. ± 420' V.D. = 0.29%
NEW (1) U.G. 1 1/4"C.-3#1 & 1#8 Cu. GRD. THWN & (1) U.G. 1 1/4"C.O. SPARE ± 400' V.D. = 1.95%
PANEL "SLB" 13A
PANEL "SHB" 10A
75 KVA TRANSFORMER "TRCB" 480V. TO 120/208V.-3ø-4W
NEW U.G. 1"C.-4#6 Cu. THWN & 1#8 Cu. GRD. ± 15' V.D. = 0.08%
NEW U.G. 2"C.-4#3/0 Cu. THWN & 1#6 Cu. GRD. ± 10' V.D. = 0.08%
PANEL "SLCB" 125A
PARTIAL SINGLE LINE DIAGRAM "MSB"
BERGELECTRIC
RECORD SET
02/19/04
DALAN ENGINEERING, INC.
ELECTRICAL ENGINEERS
8638 DARBY AVENUE NORTHRIDGE, CA. 91325
Designed MM 12/19/02
Drawn FG 12/19/02
Checked MM 12/19/02
REV. NO. DATE BY APRVD DESCRIPTION
REVIEWED BY:
Project Manager for IEUA
SCALE AS SHOWN
INLAND EMPIRE UTILITIES AGENCY
A Municipal Water District
I.E.U.A. HEADQUARTERS PHASE 1
SINGLE LINE DIAGRAM
53 OF 61
01139.02
E-300
12/19/02 BID SET


VOID ~ SEE KING & KNIGHT DRAWING # D-3308-E2 IN THE O-M MANUAL
SYMBOL LIST
BUBBLER COMPRESSOR CONTROL DIAGRAM
SINGLE LINE DIAGRAM
COMPRESSOR CONTROL DIAGRAM
AS BUILT 6-20-78
CHINO BASIN MUNICIPAL WATER DISTRICT
MONTCLAIR PUMP STATION
ELECTRICAL PLAN
SINGLE LINE, CONTROLS
NOT TO SCALE
D 4398


SHEET KEYNOTES
A. ALL POWER AND CONTROL WIRING FROM THE MCC TO EXISTING LOADS WILL BE REPLACED. EXTEND EXISTING CONDUITS TO NEW MCC AS NECESSARY.
B. REUSE EXISTING CONDUIT AND WIRING.
C. RE-LOCATE EXISTING ACOPIAN POWER SUPPLY TO THIS LOCATION FROM EXISTING MCC.
D. MCC AND EQUIPMENT INTERNAL TO MCC ARE NEW. ALL OTHER EQUIPMENT IS EXISTING.
PMCC-4001 MCC
LIGHTING PANEL LP-2
30 KVA TRANSFORMER T2
PPLC-4001 XFMR
PFEP-4001 PUMP ROOM EXH FAN
WET WELL VENTILATOR
EMPTY UNIT INSERT
AIR COMPRESSOR #1
AIR COMPRESSOR #2
SUMP PUMP
PP-4003 PUMP NO. 3
PP-4001 PUMP NO. 1
PP-4002 PUMP NO. 2
SCE METER
MAIN BREAKER
EXISTING MCC PAD
MOTOR CONTROL CENTER OPERATION ROOM
(NEW MCC FOR PHILADELPHIA PUMP STATION) N.T.S.
UTILITY
POWER CO. METER
CAT MODEL 3306 EMERGENCY GENERATOR 313KVA, 250KW, 376A, 480V, 60HZ, 3PH
TWO 250 KCMIL/PHASE
EXIST 1000A AUTO TRANSFER SWITCH
TVSS
SSM
LOCATED IN M.C.C.
480V, 800A, 3 PHASE, 3 WIRE, 42KAIC
T2 30 KVA 480/120-208V 3 PHASE
T1 (EXIST) 25 KVA 480/120-240V 1 PHASE
FERRIC STATION (EXIST) 5 KVA 480/120-240V 1 PHASE
VFD NEW (BY IEUA)
VFD EXIST
LIGHTING PANEL (LP-2)
PPLC4001 100A (EXIST)
SPARE
FERRIC STATION 1 PH. PANEL
WELDING RECEPTACLES
PUMP ROOM EXHAUST FAN
WET WELL VENTILATOR
AIR COMPR NO.1
AIR COMPR NO.2
SUMP PUMP
PUMP #3
PUMP #1
PUMP #2
03/08/07
MWH Pasadena California
INLAND EMPIRE UTILITIES AGENCY* *A Municipal Water District
NRWS PHILADELPHIA PUMP SYSTEM UPGRADES
EQUIPMENT ELEVATIONS & SINGLE LINE DIAGRAMS
SCALE AS SHOWN
SHEET E-2
SHEET NO. 22 OF 33
JOB NO. 1342599B
DRAWING NO. D6634-D22


SINGLE LINE DIAGRAM
SM2358 ELEVATION
ATS2359 AND ATS2361 ELEVATION
SWB2360, SWB2362, AND SWBD2363 ELEVATION
TYPICAL 75HP AND 150HP VFD ELEVATION
LOAD CALCULATION (25 MGD)
CITY OF FONTANA, CALIFORNIA
SAN BERNARDINO AVENUE LIFT STATION
SINGLE LINE DIAGRAM AND EQUIPMENT ELEVATIONS
Camp Dresser & McKee Inc.
E-2

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Appendix C: Yard Piping

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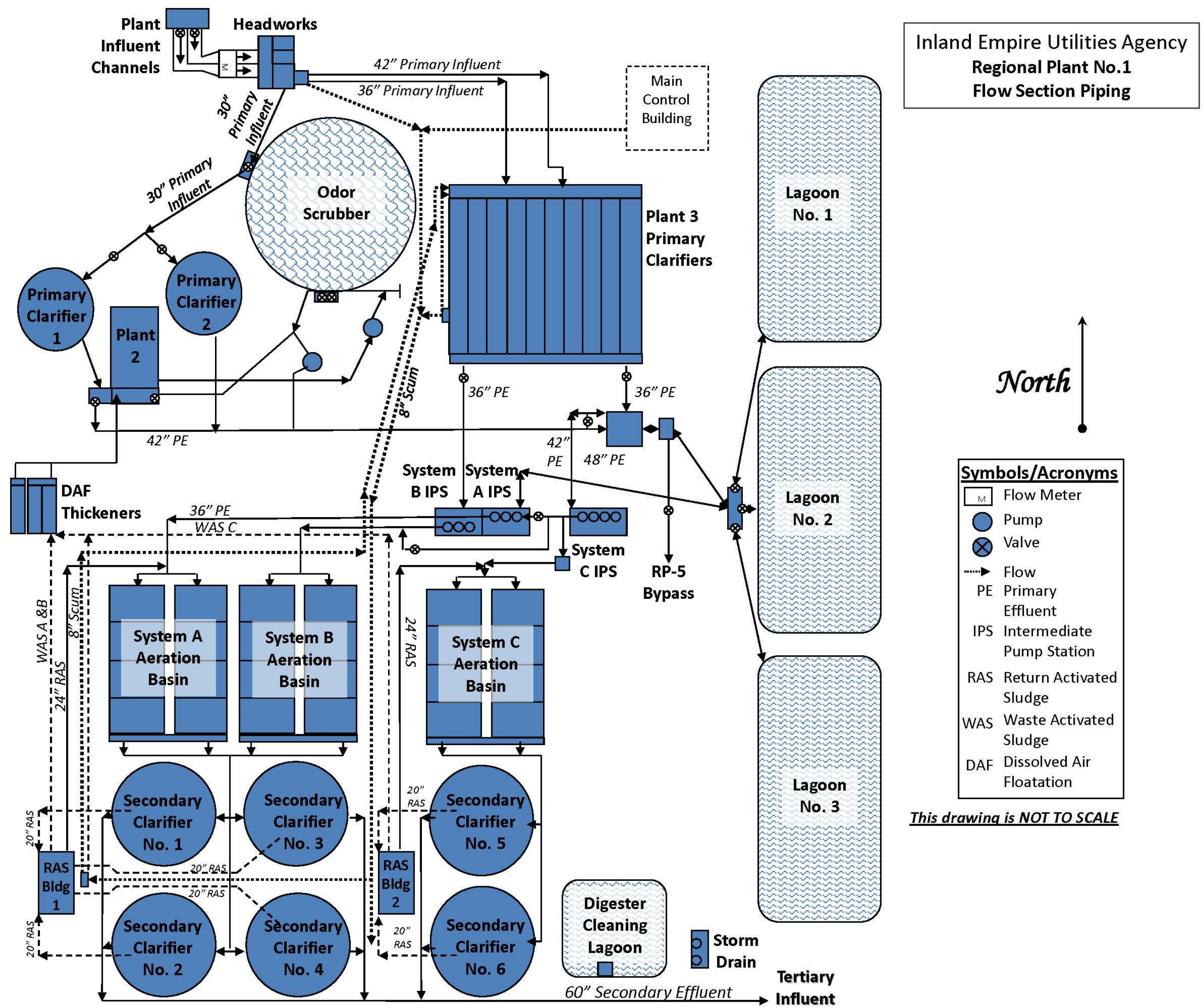
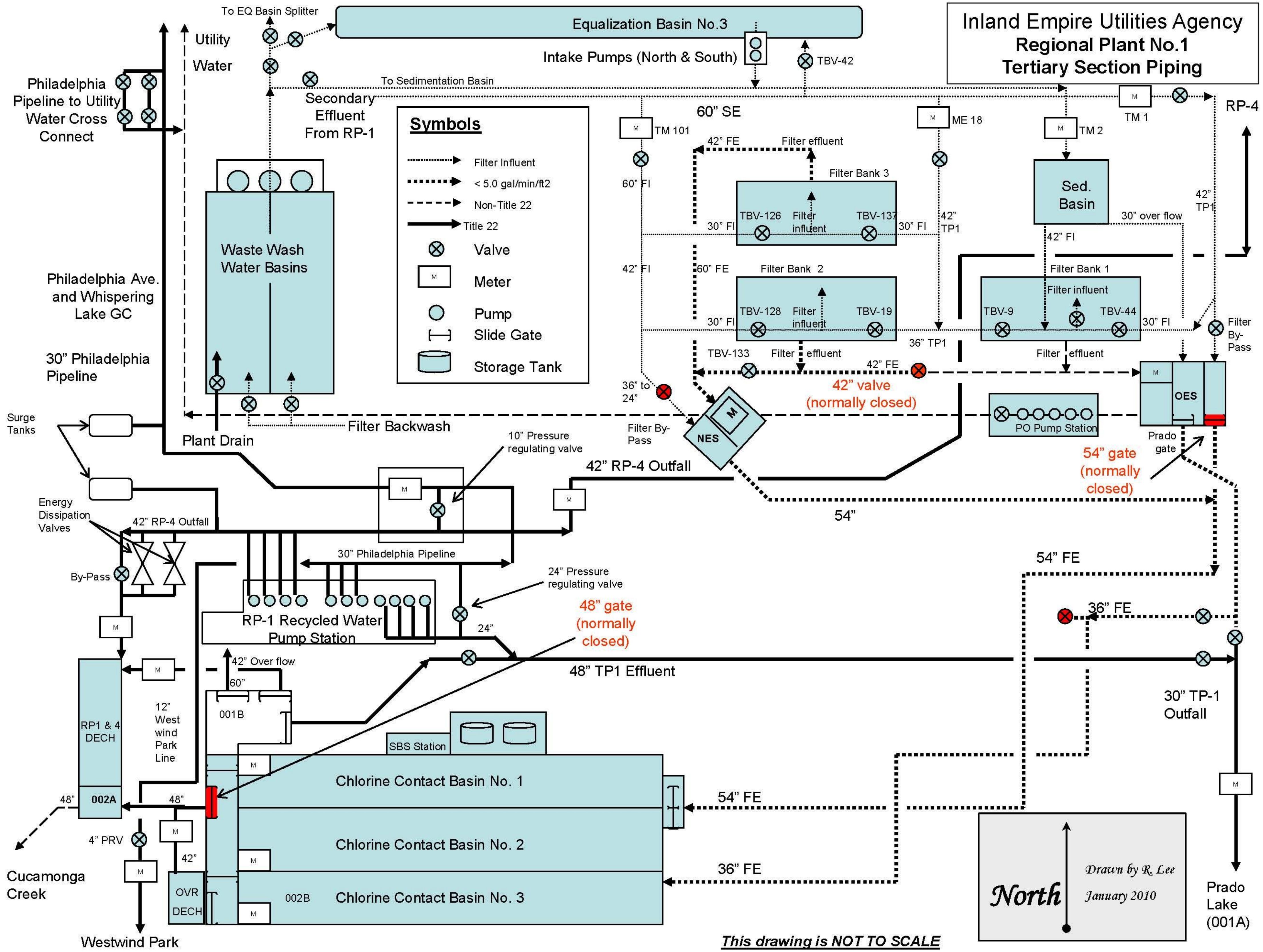
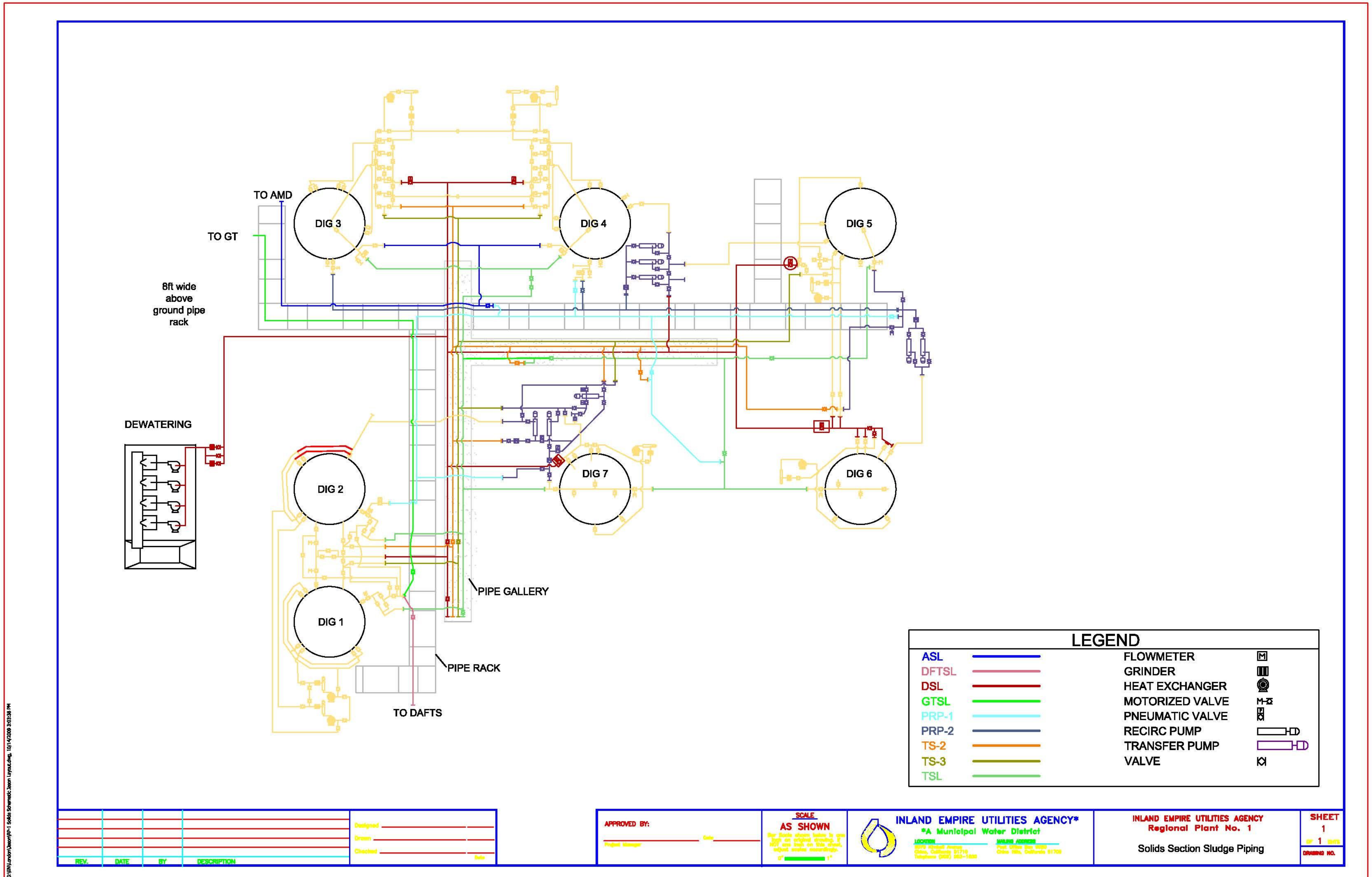


Inland Empire Utilities Agency
Regional Plant No.1
Flow Section Piping
Plant Influent Channels
Headworks
42" Primary Influent
36" Primary Influent
Main Control Building
30" Primary Influent
30" Primary Influent
Odor Scrubber
Plant 3 Primary Clarifiers
Primary Clarifier 1
Primary Clarifier 2
Plant 2
36" PE
36" PE
42" PE
42" PE
48" PE
8" Scum
Lagoon No. 1
Lagoon No. 2
Lagoon No. 3
North
System B IPS
System A IPS
System C IPS
RP-5 Bypass
DAF Thickeners
36" PE
WAS C
WAS A &B
8" Scum
24" RAS
24" RAS
System A Aeration Basin
System B Aeration Basin
System C Aeration Basin
Secondary Clarifier No. 1
Secondary Clarifier No. 2
Secondary Clarifier No. 3
Secondary Clarifier No. 4
Secondary Clarifier No. 5
Secondary Clarifier No. 6
RAS Bldg 1
RAS Bldg 2
20" RAS
Digester Cleaning Lagoon
Storm Drain
60" Secondary Effluent
Tertiary Influent
Symbols/Acronyms
Flow Meter
Pump
Valve
Flow
PE Primary Effluent
IPS Intermediate Pump Station
RAS Return Activated Sludge
WAS Waste Activated Sludge
DAF Dissolved Air Floatation
This drawing is NOT TO SCALE


Inland Empire Utilities Agency
Regional Plant No.1
Tertiary Section Piping
Symbols
Filter Influent
< 5.0 gal/min/ft2
Non-Title 22
Title 22
Valve
Meter
Pump
Slide Gate
Storage Tank
Equalization Basin No.3
Intake Pumps (North & South)
Waste Wash Water Basins
Sed. Basin
Filter Bank 1
Filter Bank 2
Filter Bank 3
PO Pump Station
NES
OES
RP-1 Recycled Water Pump Station
Chlorine Contact Basin No. 1
Chlorine Contact Basin No. 2
Chlorine Contact Basin No. 3
SBS Station
RP1 & 4 DECH
OVR DECH
48" TP1 Effluent
42" RP-4 Outfall
30" Philadelphia Pipeline
42" valve (normally closed)
54" gate (normally closed)
48" gate (normally closed)
Cucamonga Creek
Westwind Park
Prado Lake (001A)
North
Drawn by R. Lee
January 2010
This drawing is NOT TO SCALE



TO AMD
TO GT
DIG 3
DIG 4
DIG 5
8ft wide above ground pipe rack
DEWATERING
DIG 2
DIG 7
DIG 6
DIG 1
PIPE GALLERY
PIPE RACK
TO DAFTS
LEGEND
ASL
DFTSL
DSL
GTSL
PRP-1
PRP-2
TS-2
TS-3
TSL
FLOWMETER
GRINDER
HEAT EXCHANGER
MOTORIZED VALVE
PNEUMATIC VALVE
RECIRC PUMP
TRANSFER PUMP
VALVE
REV.
DATE
BY
DESCRIPTION
APPROVED BY:
SCALE
AS SHOWN
INLAND EMPIRE UTILITIES AGENCY*
*A Municipal Water District
INLAND EMPIRE UTILITIES AGENCY
Regional Plant No. 1
Solids Section Sludge Piping
SHEET
1
OF 1
DRAWING NO.

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