



APPENDIX A MDE LETTER



CERTIFIED MAIL/ELECTRONIC MAIL

Yosef Kebede, Head
Bureau of Water and Wastewater
Baltimore City Department of Public Works
200 Holliday Street
Baltimore, Maryland 21202

**Re: Back River Wastewater Treatment Plant, AI# 8449, 15-DP-0581A
Information Request**

Dear Mr. Kebede:

The Maryland Department of the Environment (the "Department") acknowledges the recent corrective actions that the Baltimore City Department of Public Works (the "City") has implemented at the Back River Wastewater Treatment Plant (the "Back River WWTP") to address operational and mechanical deficiencies. However, the City must expedite its retention of sufficient qualified staff and conduct all appropriate work to bring all of the essential processes and units into efficient operation in order to ensure compliance with the Back River WWTP's discharge permit, State Discharge Permit No. 15-DP-0581A.

The Department has met with City personnel on several occasions and has reviewed the following documents submitted by the City:

- the letter from Yosef Kebede to Lee Currey, dated September 7, 2021;
- the "Strategic Plan for MDE Compliance," undated, submitted on September 17, 2021;
- the "Strategic Plan for MDE Compliance at Back River Wastewater Treatment Plant," undated, submitted on October 7, 2021;
- the letter from Michael Hallmen to Ron Wicks, dated October 20, 2021;
- the "Progress Report," dated November 15, 2021;
- the email from Michael Hallmen to Sharon Talley, dated November 22, 2021 re: "Operator Certifications - PWWTP and BRWWTP,"
- the "BRWWTP Progress Report," dated November 30, 2021;
- the "Back River WWTP Plant Operational Assessment," undated, submitted on December 20, 2021;
- the "BRWWTP Progress Report," dated January 5, 2022;
- the "BRWWTP Progress Report," dated January 15, 2022;
- the "Back River Operation Changes.xlsx" and the "Back River status spreadsheet.xlsx," submitted on January 29, 2022; and
- the "220211 Back River status spreadsheet.xlsx," submitted on February 11 and 15, 2022.

Mr. Yousef Kebede, AI# 8449
Back River WWTP

The Department's review has raised significant concerns about (a) the City's prioritization of projects, (b) long completion deadlines, and (c) the absence of a full treatment train engineering report.

This letter serves as a request for additional information on the prioritization of projects and the City's target completion dates of projects intended to bring the Patapsco WWTP into permit compliance on the following topics:

- a. Adequate Staffing
- b. Primary Settling Tank Cleaning, Maintenance, & Repair
- c. Enhanced Nutrient Reduction & Denitrification Filters
- d. Sand Filter Rehabilitation
- e. Suspended Solids Reduction
- f. Capital Project List
- g. Third-Party Certified Engineering Evaluation & Report
- h. Industrial Stormwater Discharge Permit
- i. Plant Tour & Meeting

The Department's request for additional information is attached hereto as "Attachment A." Obtaining this information from the City is necessary for the Department to understand the scope and nature of the short, intermediate, and long-term actions required to operate the plant efficiently now, tomorrow, and into the future.

The Department appreciates the City's continued cooperation in this matter. If you have any questions, please do not hesitate to contact Ms. Sharon Talley, Program Manager, Compliance Program at (410) 537-3510 or by email at sharon.talley@maryland.gov.

Sincerely,



D. Lee Currey (Mar 4, 2022 12:52 EST)

D. Lee Currey, Director
Water and Science Administration

DLC:ldr

Enclosures (via electronic mail only)

cc: Alice Volpitta, Baltimore Harbor Waterkeeper, Blue Water Baltimore
Jonathan E.C. May, Assistant Attorney General
Nathan P. Short, Assistant Attorney General

ATTACHMENT A

Back River WWTP Requested Information

(March 3, 2022)

a. Adequate Staffing

Baltimore City (the “City”) has had difficulty in recent years recruiting and retaining employees at the Back River Wastewater Treatment Plant (“Back River WWTP”). In the summer of 2021, the Back River WWTP had a vacancy rate of 25%.

Within 30 days, provide the following information regarding plant personnel

- the optimum number of permanent staff necessary for each of the major process units (e.g., primary clarification, activated sludge, etc.) to ensure the plant can operate efficiently and produce effluent quality as designed,
- the cost of employing the optimum number of permanent staff to efficiently operate the plant,
- the number of temporary staff currently working at each major process unit,
- the remaining vacancies for permanent positions in each of the major process unit, and
- the webpages where job postings are located, and the anticipated dates that the optimum number of permanent staff will be in place at each of the major process units.

Additionally, as detailed in the “Operators Certification 2021-2022-PWWTP” attachment to the November 22, 2021 email regarding “Operator Certifications - PWWTP and BRWWTP,” many of the superintendents and operators have temporary certifications.

Within 14 days, update and submit to the Department the attached “211112 Back River Operators Cert.status.xlsx” spreadsheet.¹

The Board of Waterworks & Waste Systems Operators Board (“WWSO”) has also informed the Department that the City submits confusing or incomplete applications or payments, has a history of not providing proof of attendance for approved City-led training for operators, does not appear to provide any guidance on appropriate outside training, and generally does not appear to understand the certification process requirements.

¹ During the March 1, 2022 conference call, the Department was informed that the City had added approximately seven additional temporary certified operators and was likely to add three more in two weeks.

Within 30 days, please also provide a plan to obtain and maintain appropriate certifications for superintendents and operators.

b. Primary Settling Tank Cleaning, Maintenance, & Repair

The Back River WWTP was designed to treat a maximum of 400 million gallons per day (“MGD”), more than twice the estimated average daily receipt of wastewater (180 MGD). To do so, the Back River WWTP has eleven primary settling tanks (“PSTs”) in its wastewater treatment chain. Assuming that each PST has a proportional treatment capacity of the plant’s maximum treatment capacity, each PST can treat 36.36 MGD (400 MGD / 11 PSTs). In 2021, the Back River WWTP’s average flow was approximately 114 MGD, which is only 63% of its average design capacity.

The 220211 Back River Status Spreadsheet.xlsx states that

- a. “3 [PSTs are] currently functioning,”
- b. “[t]wo more [will] be in service with [sic] two weeks,”
- c. “funds [have been] procured for synagro [sic] to clean a third PST,” and
- d. “coupled with SC 954 will bring all 11 PST’s into service.”

The Back River WWTP does not presently have sufficient PST treatment capacity for an extreme wet weather event. Therefore, the Back River WWTP continues to violate General Condition III(B)(3)(a) of the Back River Discharge Permit, as it has failed to operate the Back River WWTP efficiently to minimize upsets and discharges of excess pollution, and General Condition III(B)(4)(b) as it has failed to “take all reasonable steps to minimize any adverse impact to the waters of this State, human health or the environment.”

Within 30 days, provide a detailed description of each PST with

- a. the present operational status,
- b. any maintenance, repair, or replacement activities that are necessary to place it in service, and
- c. the date by which it will be placed in service².

Within 30 days, provide also

- a. the projected cost to bring all PSTs into service,

² During the March 1, 2022 conference call, the Department was informed that the City would repair two PSTs in 90 to 120 days (May 30, 2022 to June 29, 2022).

- b. the minimum number of PSTs required to operate the plant as designed and to meet discharge permit effluent limits,
- c. the anticipated date that a sufficient number of PSTs will be in service to operate the plant as designed and to meet discharge permit effluent limits, and
- d. a PST maintenance and rotation plan, specifying the frequency and order that PSTs will be rotated out of service for maintenance and repair to optimize PST performance and service life.

c. Enhanced Nutrient Reduction & Denitrification Filters

While the Back River WWTP includes an Enhanced Nutrient Removal (“ENR”) process to treat nitrogen and phosphorus pollution in the wastewater, it exceeded the concentration-based annual loading limits for both total nitrogen (“TN”) and total phosphorus (“TP”) in 2021.

Poor ENR performance at the Back River WWTP is largely a result of insufficient solids removal from upstream processes clogging the denitrification filters (“DN Filters”) and inadequate control and maintenance of the DNFs. *See Back River WWTP Plant Operational Assessment,* undated, submitted on December 20, 2021, at 4.

Although Baltimore City has implemented several short-term corrective actions to improve ENR performance, it appears likely that the Back River WWTP will not meet effluent nutrient limitations in the near future.

The January 5, 2022 BRWWTP Progress Report identifies the completion of the engineering review of the Denitrification Facility operations “with recommended repairs for optimal performance” review. However, the February 11 and 15, 2022 Back River status spreadsheet includes no recommendations or time-frame for completion of this project.

Within 7 days, provide appropriate reports from the “data dashboard” sufficient to show each pollutant’s concentration throughout the full treatment process.

Within 30 days, provide a detailed description of each DN Filter, including:

- a. the present operational status,
- b. any maintenance, repair, or replacement activities that are necessary to operate the DNF efficiently, and
- c. the date by which improvements to the DN Filters will be completed.

Within 30 days, provide also:

- a. a report regarding DN Filters operations, including recommendations for improvements and a schedule for completion³,
- b. the projected cost to bring the DN Filters into service,
- c. the minimum number of DN Filters required to operate the plant as designed and to meet discharge permit effluent limits,
- d. the anticipated date that a sufficient number of DN Filters will be in-service to operate the plant as designed and to meet discharge permit effluent limits.

d. Sand Filter Rehabilitation

In order to treat the Back River WWTP's 2021 114 MGD average flow, the plant has 48 sand filters in its wastewater treatment chain. The 220211 Back River Status Spreadsheet.xlsx states that, of the plant's 48 sand filters, only "15 [are] currently operational."

With only a third of the sand filters operational, the plant may not have sand filter treatment capacity for the average flow or extreme wet weather events. The City has not provided a date by which the other 33 sand filters will be operational.

Within 30 days, provide:

- a. a report regarding sand filter operations, including recommendations for improvements and a schedule for completion⁴,
- b. the projected cost to bring the sand filters into service,
- c. the minimum number of sand filters required to operate the plant as designed and to meet discharge permit effluent limits,
- d. the anticipated dates⁵ by which a sufficient number of sand filters will be in-service to operate the plant as designed and to meet discharge permit effluent limits, and

³ During the March 1, 2022 conference call, the Department was informed that the City needed to re-automate the DN Filters and would do so in 30 to 45 days (March 31, 2022 to April 15, 2022).

⁴ During the March 1, 2022 conference call, the Department was informed that Ace Construction would provide a quote to the City by March 11, 2022.

⁵ During the March 1, 2022 conference call, the Department was informed that the City would have 20 additional sand filters in service by September 2022.

- e. the anticipated date of completion of the sand filter capital improvement project.⁶
- e. Suspended Solids Reduction

Milestones for significant projects necessary to achieve compliance with total suspended solids (“TSS”) are identified in the October 7, 2021 strategic plan for the Back River WWTP as “immediate” and “long-term.” In addition to the rehabilitation of sand filters, the City has explained, during the February 15, 2022 conference call, that reducing total suspended solids (“TSS”) will have a “significant impact” on the plant’s ability to achieve compliance with its discharge permit effluent limits.

The most recently reviewed Discharge Monitoring Reports (“DMRs”) for December 2021 indicate that the plant experienced six total phosphorus (“TP”) excursions, including violations of monthly average and daily maximum loading and concentration effluent limits. Further, for the full year of 2021, the plant exceeded its TSS annual loading limit by more than 2.7 million pounds. For the same year, the plant exceeded its TN and TP concentration-based limits by approximately 622,000 and 84,000 pounds, respectively.

The 220211 Back River Status Spreadsheet.xlsx designates the biosolids (December 31, 2025 completion date) and egg digester rehabilitation (no planned completion date) projects as “Long Term” projects. The Department is concerned that the plant will continue to experience effluent violations until such time that these major projects are completed.

Within 30 days, provide accelerated schedules for the completion of the biosolids and egg digester rehabilitation projects.

f. Capital Project List

Within 30 days, provide the Department with a full list of all capital improvement projects related to the operation of the Back River WWTP. For each project, include the sanitary contract number, the names of all vendors, and all categories contained in 220211 Back River status spreadsheet.xlsx.

For each project, include:

- a. the date the project was first identified,
- b. the date the project was advertised,
- c. the date a notice to proceed was issued,

⁶ During the March 1, 2022 conference call, the Department was informed that the City would completely rehabilitate all of the sand filters in five years (March 1, 2027).

- d. the names of all vendors,
- e. the sanitary contract number,
- f. the budget amount, and
- g. the following categories contained in the 220211 Back River status spreadsheet.xlsx:
 - i. planned completion date,
 - ii. present estimated completion date,
 - iii. actual completion date,
 - iv. percent completed,
 - v. funding status,
 - vi. progress, and
 - vii. timeframe.

g. Third-Party Certified Engineering Evaluation & Report

Within 90 days, provide the Department with a third-party certified engineering evaluation and report for the plant's operation and equipment. The report shall include a comprehensive list of needed improvements, ranked by their impact on compliance with discharge permit effluent limits.

The Department intends that a negotiated resolution of the pending litigation will require the implementation of the findings and recommendations of this third-party certified engineering evaluation report.

h. Industrial Stormwater Discharge Permit

Within 14 days, provide a detailed description of all the actions taken in response to the June 25, 2021 inspection and report regarding the plant's compliance with its 12-SW permit authorization.

i. Plant Tour & Meeting

Please provide three dates in March 2022 for the City to provide a tour of the Back River WWTP with a follow up meeting regarding the engineering plan details and schedule.



APPENDIX B FACILITY OVERVIEW

APPENDIX B – FACILITY OVERVIEW

PRIMARY SETTLING TANKS

Settling of primary solids in the raw wastewater after preliminary treatment. Facilities include eleven (11) PSTs and Primary Sludge Pump Stations. Settled primary sludge is pumped to the Gravity Sludge Thickeners (GSTs).



Primary Sedimentation Tank

ACTIVATED SLUDGE REACTORS AND SECONDARY CLARIFIERS

The Activated Sludge process receives primary effluent and provides organic (BOD) removal and nitrification (ammonia-nitrogen removal). Facilities include AS trains 2, 3, and 4. The AS 4 was under construction and was online during April –May 2022. Each AS plant includes six (6) reactors and twelve (12) secondary clarifiers, return activated sludge (RAS) and waste activated sludge (WAS) pumping. Submersible pumps are employed for internal reactor recycle of nitrified effluent that provides for nutrient (nitrogen) removal. Each train has a Blower Building which houses the process aeration blowers that supply air to the activated sludge process.

The process configuration is a plug flow system with baffles (AS 2 and 3 are three-pass and AS 4 is a two-pass) designed to divide the reactor into several zones which can be operated as anoxic, swing, and aerobic zones. The anoxic zones include submersible mixers, while aerobic zones are equipped with diffuser grids. The swing zones are equipped with both mixing and aeration. The process configuration is a modified Ludzack-Ettinger process for BOD and nitrogen removal. Phosphorus removal is achieved by chemical precipitation.



Activated Sludge Reactors

DENITRIFICATION FILTERS

Denitrification Filters provide enhanced nutrient to meet the stringent permit limits. Ancillary facilities include filter influent pumps, filter backwash equipment, chemical storage and feed facilities and operational areas. There are total fifty-two (52) filters [four (4) quads of thirteen (13) filters]. The purpose of the denitrification filters is to remove nitrite and nitrate as well as the TSS and total phosphorus from the secondary clarifier effluent. This process is critical for the plant to achieve the effluent quality to ENR treatment levels.



Denitrifying Filters



Backwash Treatment

The backwash treatment facility treats the spent filter backwash water. Facilities include grit removal, backwash clarifiers and sludge pumping station. The plant has indicated operational issues due to migration of some of the filter sand media through filter backwashing. The media settles in the clarifiers and causes excessive abrasion and wear on the backwash sludge pumps.

SAND FILTERS



Sand Filters

Sand Filters were constructed prior to the Denitrification Filters. These provide final effluent filtration to reduce the TSS and TP further from the denitrification filter effluent. Sand Filtration facilities include shallow bed mono-media travelling bridge sand filters and backwash pumping station.

CHLORINATION AND DECHLORINATION FACILITY

Flow is directed to the CCTs for chlorination to disinfection and dechlorination to remove excess chlorine and then aerated via step aeration before it is discharged to the two outfalls.

GRAVITY SLUDGE THICKENERS (GSTS)



Gravity Sludge Thickener

The sludge from the PSTs is thickened by the Gravity Sludge Thickeners (GSTs). The thickened sludge from the GSTs and the Thickened WAS from the Dissolved Air Flootation is blended and stored in the thickened sludge holding tanks prior to be digested anaerobically.

PRIMARY SLUDGE THICKENING DISSOLVED AIR FLOTATION (DAF)



Dissolved Air Flotation

DAF thickening of waste activated sludge (WAS) prior to digestion.

SLUDGE HOLDING TANKS



Holding Tank

There are two sludge holding tanks which receive sludge from the gravity sludge thickeners, the dissolved air flotation system, and the gravity belt thickeners. The blended sludge is stored in the holding tanks prior to anaerobic digestion.

ANAEROBIC DIGESTION



Egg Shaped Digester

Once thickened, sludge is stabilized through a two-step process consisting of acid-phase reaction and anaerobic digestion, yielding Class B biosolids, in accordance with the 40 CFR Part 503 regulations Class B biosolids (digested sludge). The anaerobic digestion facilities at the plant include Acid Phase Reactor, Egg Shaped Digesters, and High Rate Digesters. The digested sludge is conveyed to the digested sludge holding tanks.

DEWATERING FACILITIES



Centrifuge

The digested sludge is dewatered by the centrifuges operated by the City and is conveyed to the Rapid Sludge Loading Facility which is sent out for Composting. Centrate is directed to a holding tank and ultimately directed back to the head of the plant.

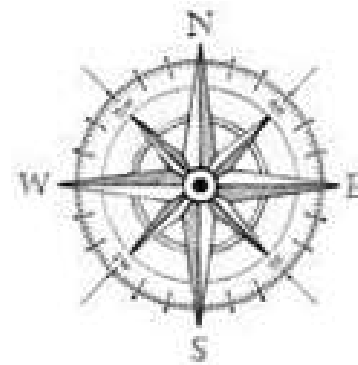
A portion of the digested sludge is conveyed to a dryer facility that dewateres and dries the biosolids further for beneficial reuse such as agricultural land application. This facility is owned and operated by Third Party firm under a public private partnership (PPP) arrangement with the City since the early 1990s.



APPENDIX C VACANCY ANALYSIS

Division	Vacancies	Total Number	Vacancy Percentage	Page	Sheet #
Wastewater Facilites Overview	167	545	30.64%	1A	3
Wastewater Facilites Overview w/ Direct Reports	6	23	26.09%	1B	4
Administrative Support	3	12	25.00%	2	5
Division-Wide Activities	17	33	51.52%		
Engineering/Capital Improvements	8	12	66.67%	3	6
Computer Services (Shared Services)	0	3	0.00%	4	7
Inventory Control (Shared Services)	9	18	50.00%	5	8
Back River	61	208	29.33%		
Overview	2	2	100.00%	6	9
Operations - Sludge	9	58	15.52%	7	10
Operations - Water	8	31	25.81%	8	11
Maintenance	42	117	35.90%		
<i>Instrumentation</i>	6	12	50.00%	9	12
<i>Buildings & Grounds</i>	9	33	27.27%	10	13
<i>Electrical</i>	7	28	25.00%	11	14
<i>Mechanical</i>	20	44	45.45%	12	15
Patapsco	49	155	31.61%		
Operations - Secondary Treatment	12	46	26.09%	13	16
Operations - Primary Treatment	9	34	26.47%	14	17
Maintenance	28	75	37.33%		
<i>Instrumentation</i>	4	11	36.36%	15	18
<i>Buildings & Grounds</i>	9	25	36.00%	16	19
<i>Electrical</i>	3	13	23.08%	17	20
<i>Mechanical</i>	12	26	46.15%	18	21
Pumping Stations	15	51	29.41%		
Operations	8	33	24.24%	19	22
Maintenance	7	18	38.89%		
<i>Electrical & Mechanical</i>	7	18	38.89%	20	23
Pollution Control	8	22	36.36%	21	25/26
Wastewater Labs	8	28	28.57%	22	27

BUREAU OF WATER & WASTEWATER WASTEWATER FACILITIES DIVISION



ORGANIZATIONAL CHARTS
FISCAL YEAR 2022
MICHAEL HALLMEN, MANAGER



Baltimore City Department of Public Works



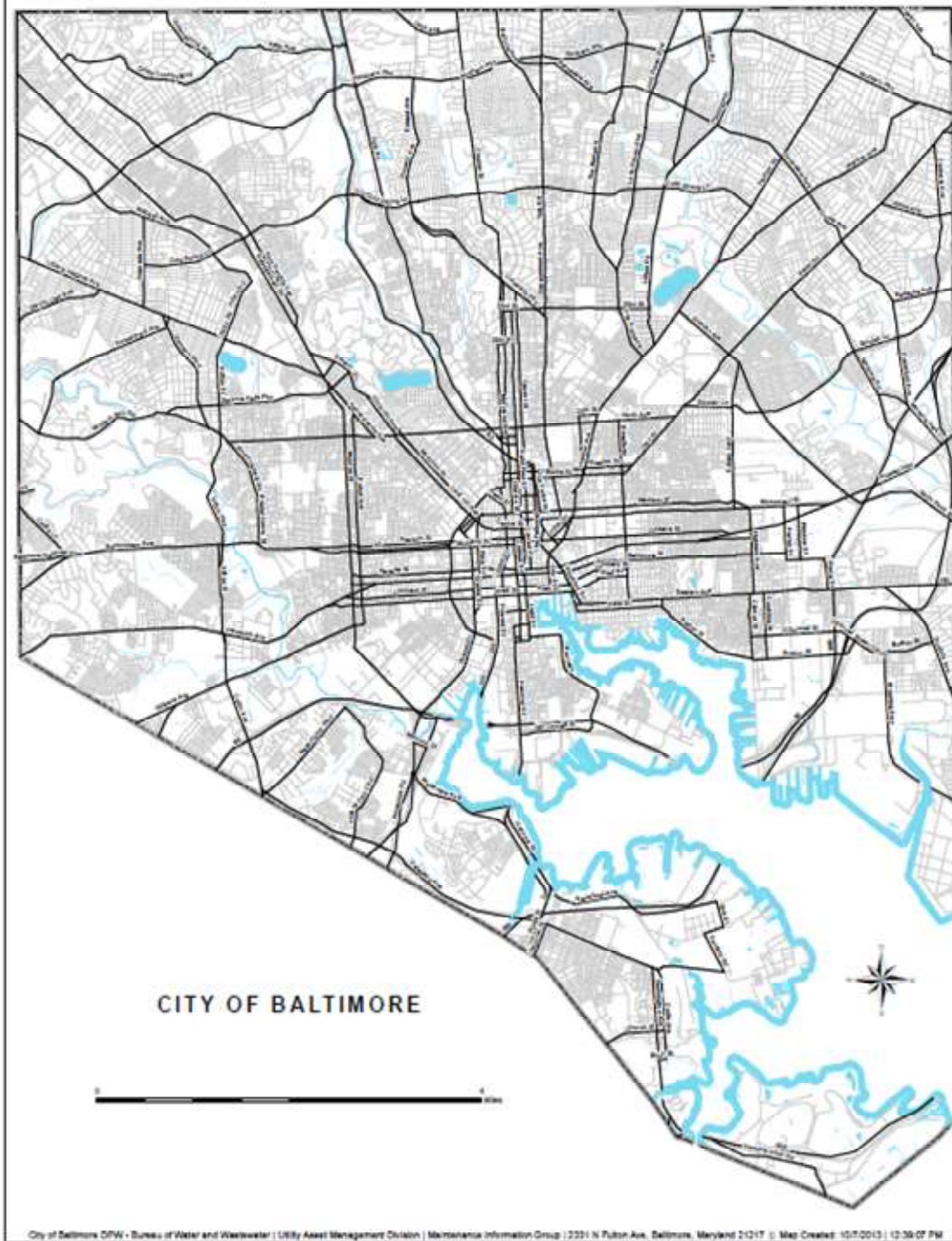
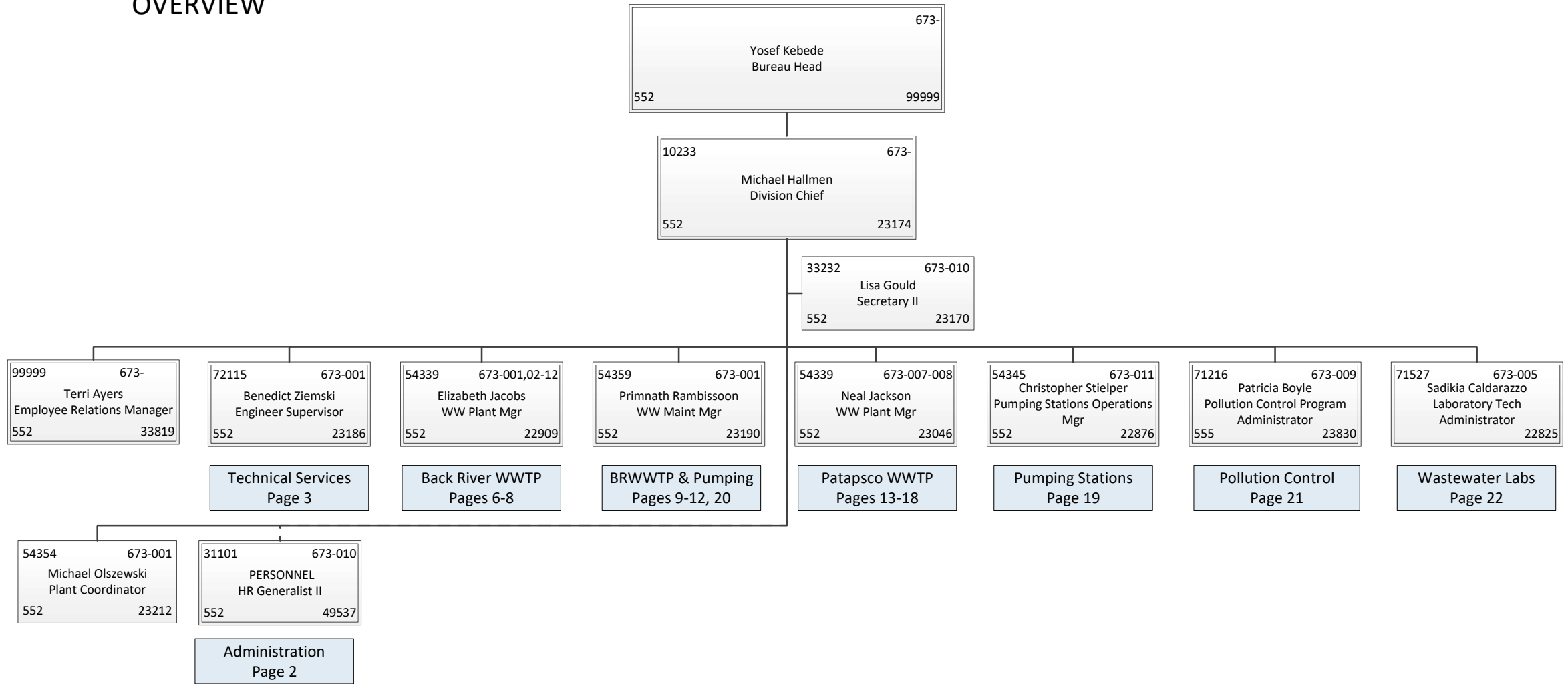


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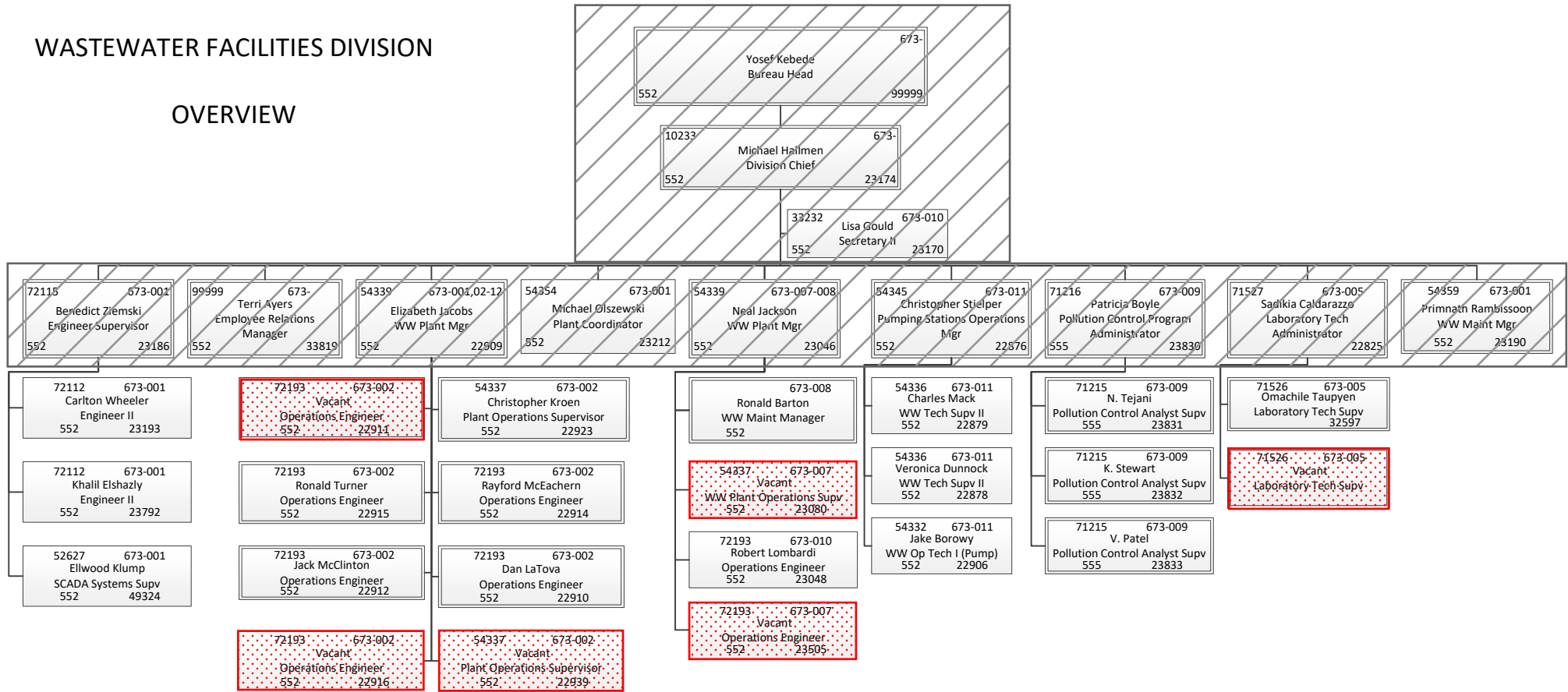
WASTEWATER FACILITIES DIVISION

OVERVIEW

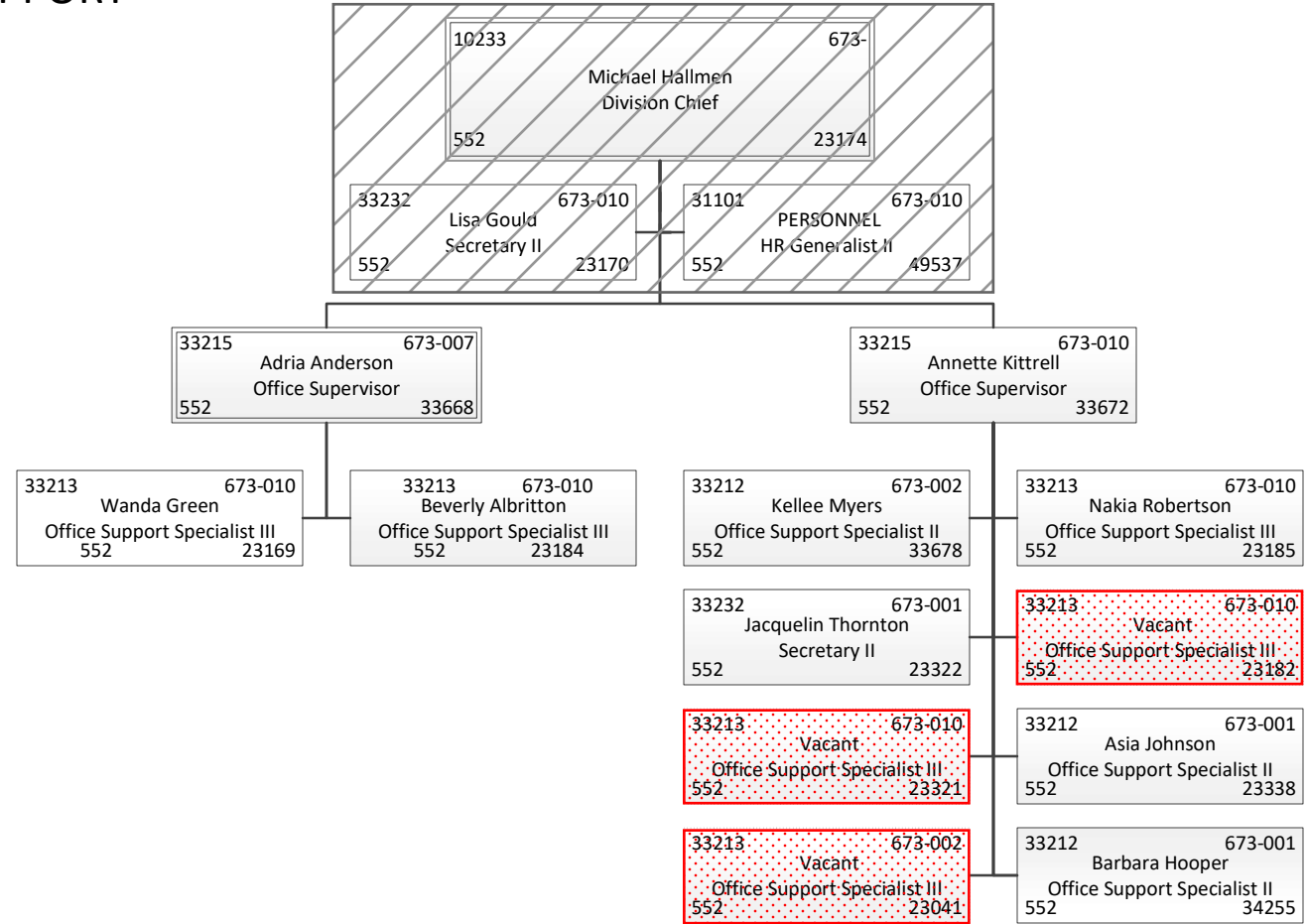


WASTEWATER FACILITIES DIVISION

OVERVIEW

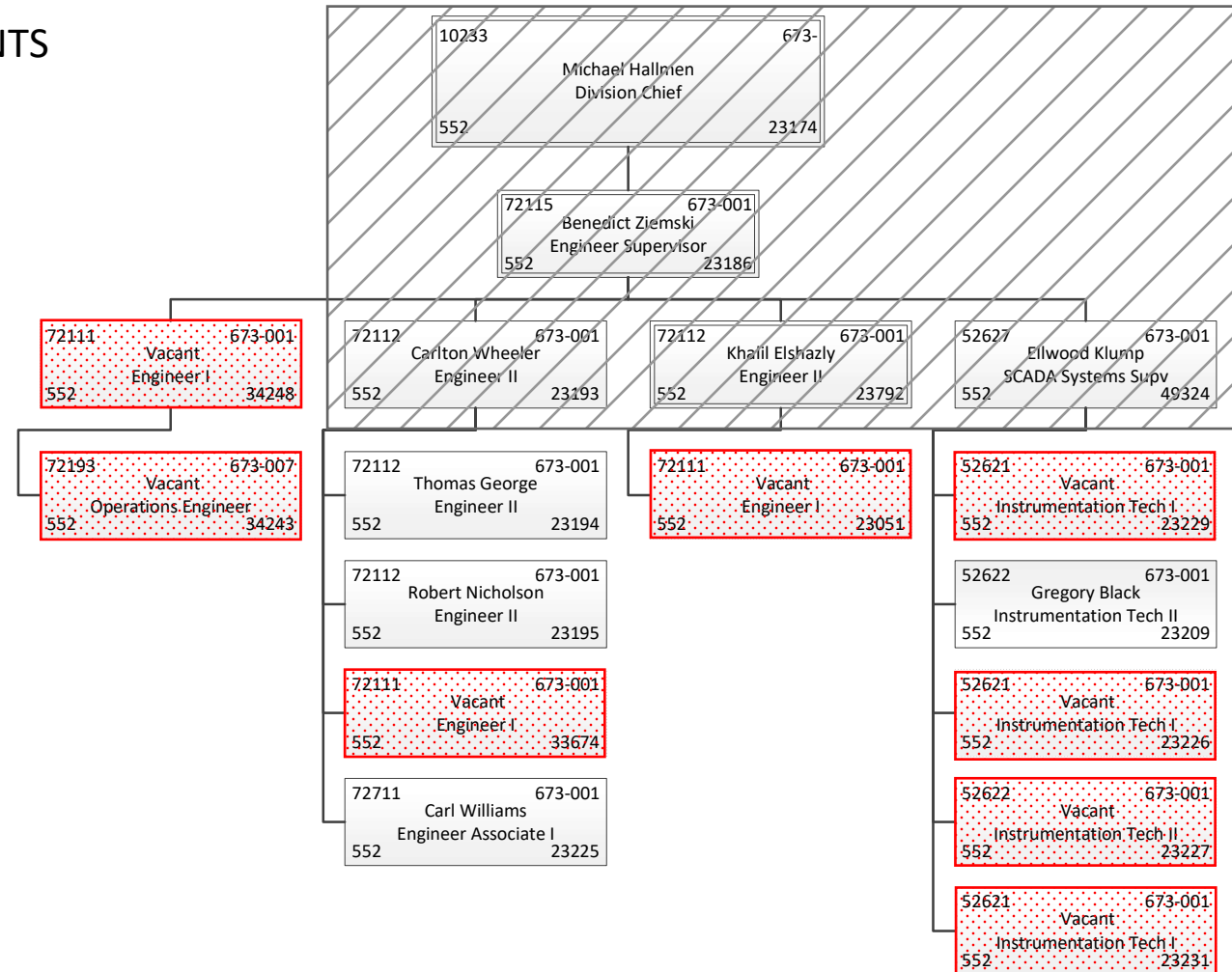


WASTEWATER FACILITIES DIVISION ADMINISTRATIVE SUPPORT



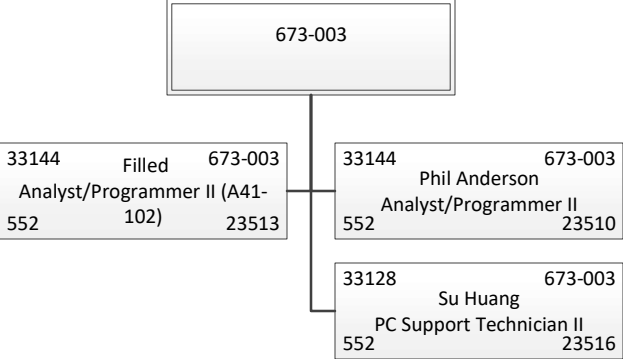
Vacancy Percentage: 3/12 - 25%

WASTEWATER FACILITIES DIVISION
 ENGINEERING/CAPITAL IMPROVEMENTS
 673-001



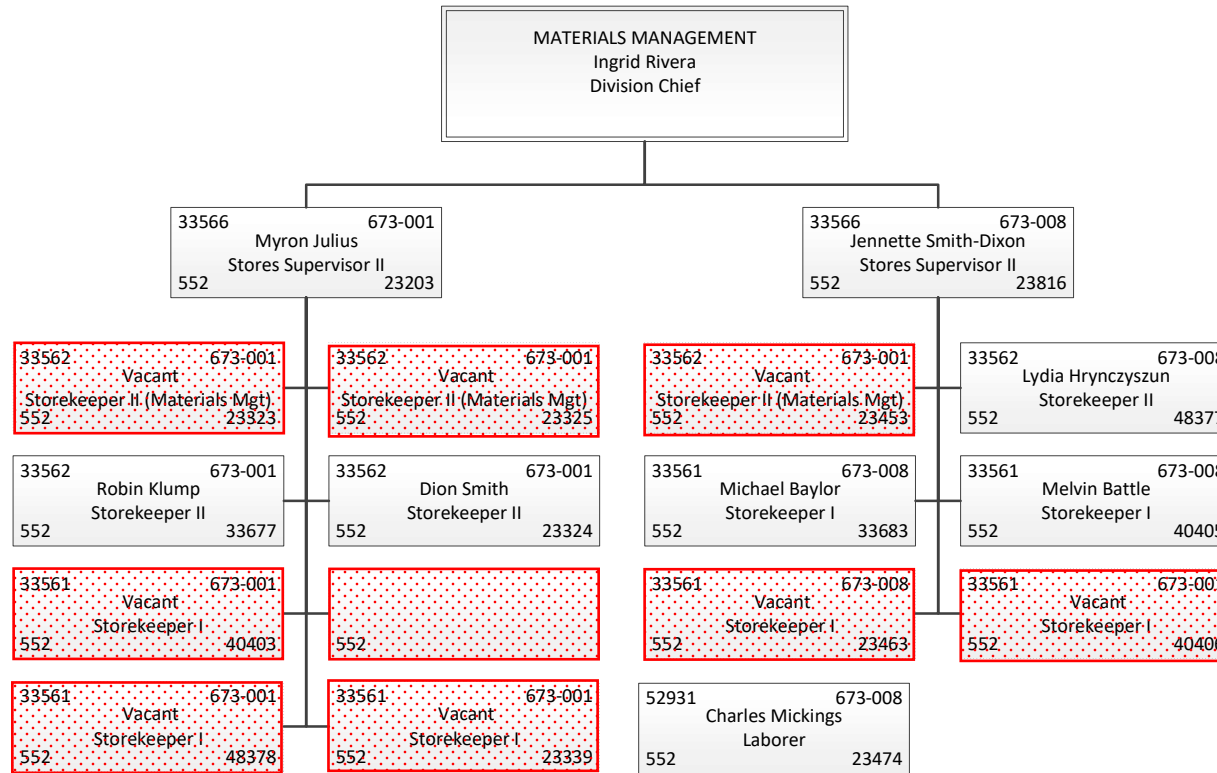
Vacancy Percentage: 8/12 - 67%

WASTEWATER FACILITIES DIVISION
SHARED SERVICES
COMPUTER SERVICES/PROCESS CONTROL
673-003



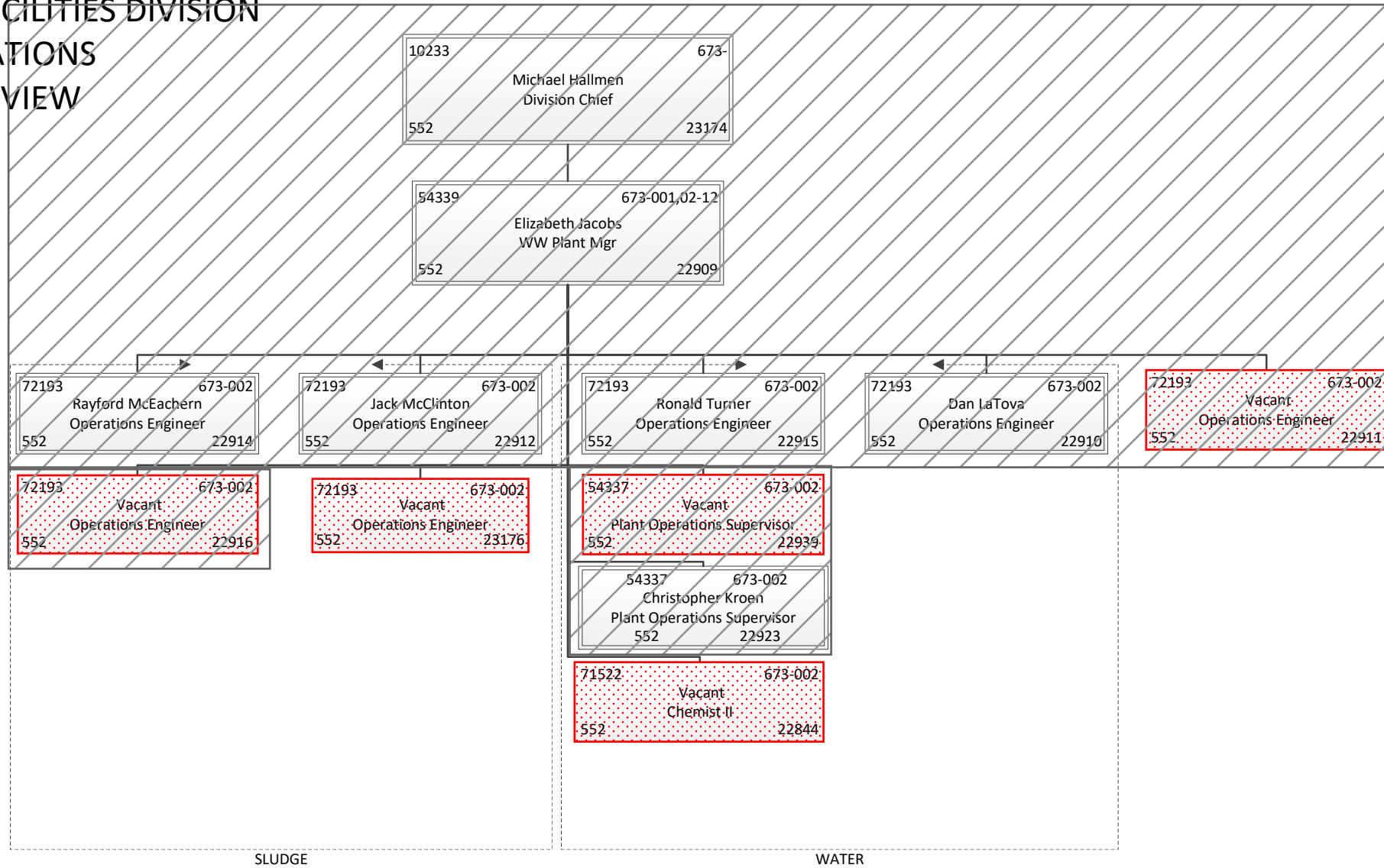
Vacancy Percentage: 0/3 - 0%

WASTEWATER FACILITIES DIVISION
 SHARED SERVICES
 INVENTORY CONTROL
 673-001



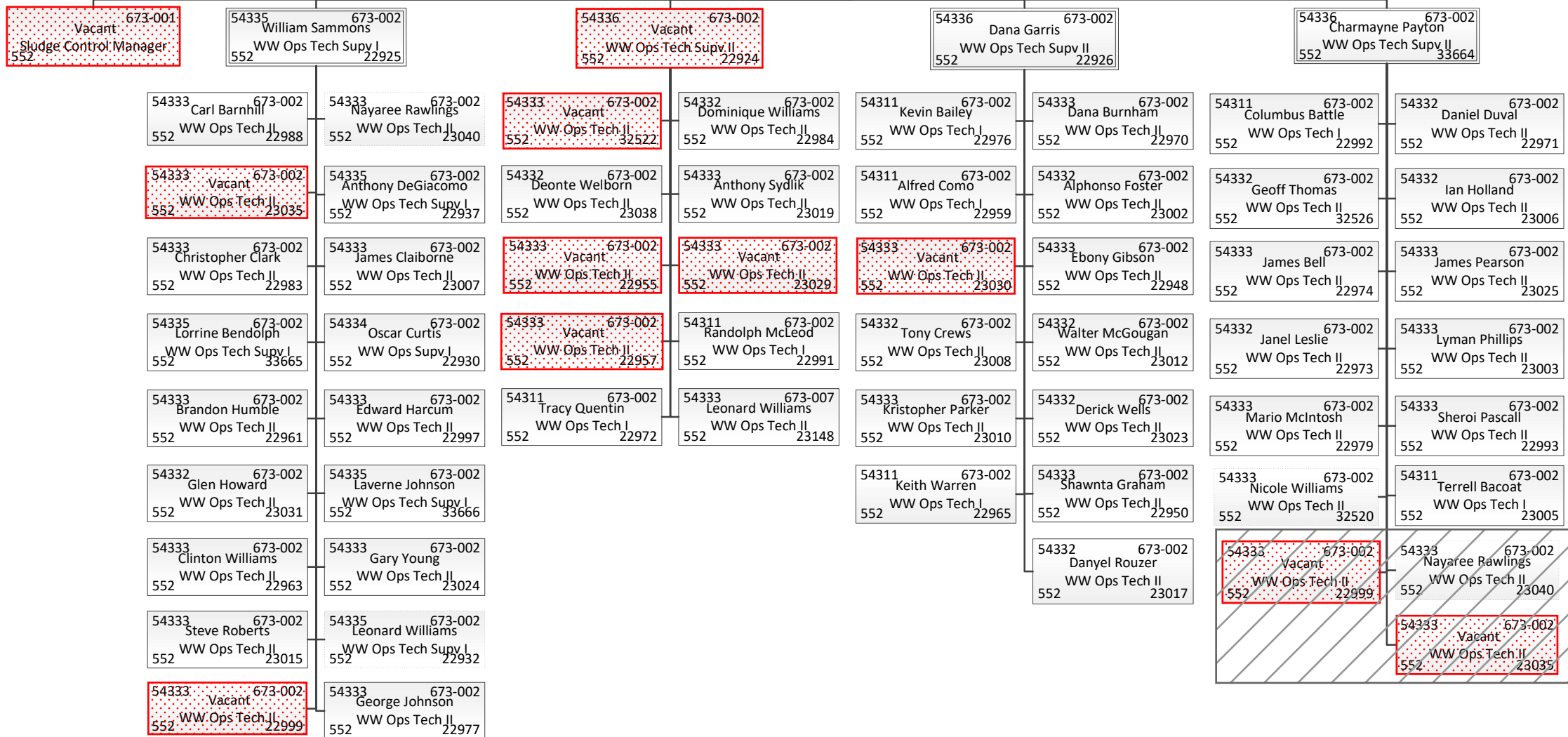
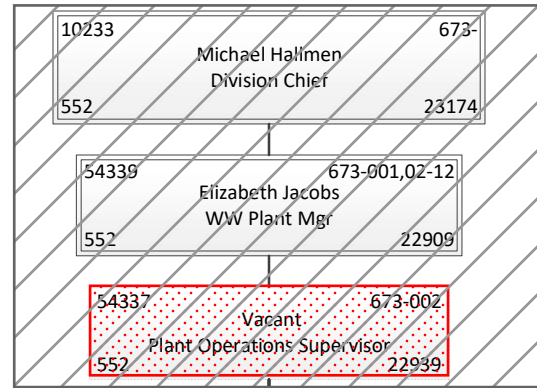
Vacancy Percentage: 9/18 - 50%

WASTEWATER FACILITIES DIVISION OPERATIONS OVERVIEW



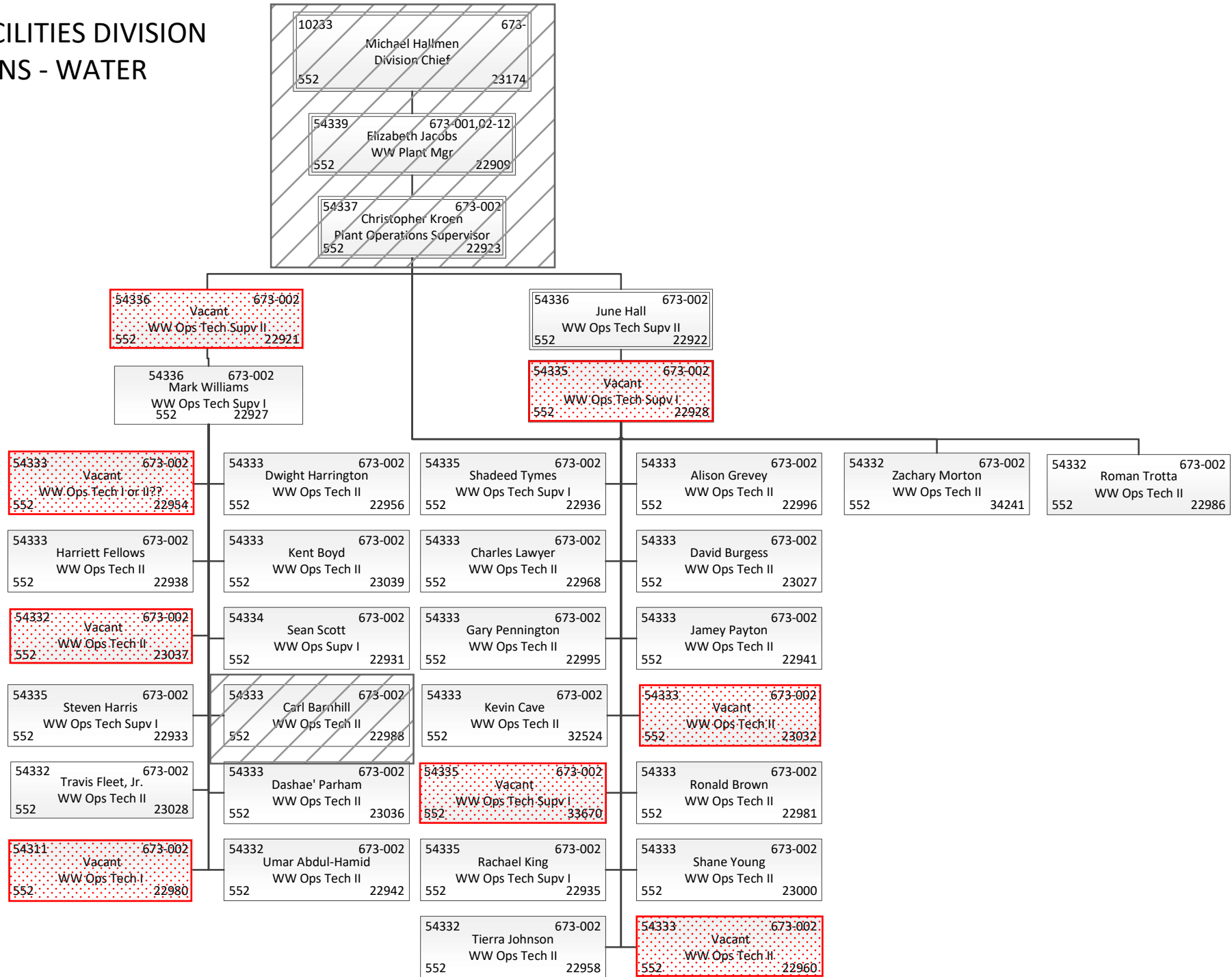
Vacancy Percentage: 2/2 - 100%

WASTEWATER FACILITIES DIVISION SLUDGE OPERATIONS

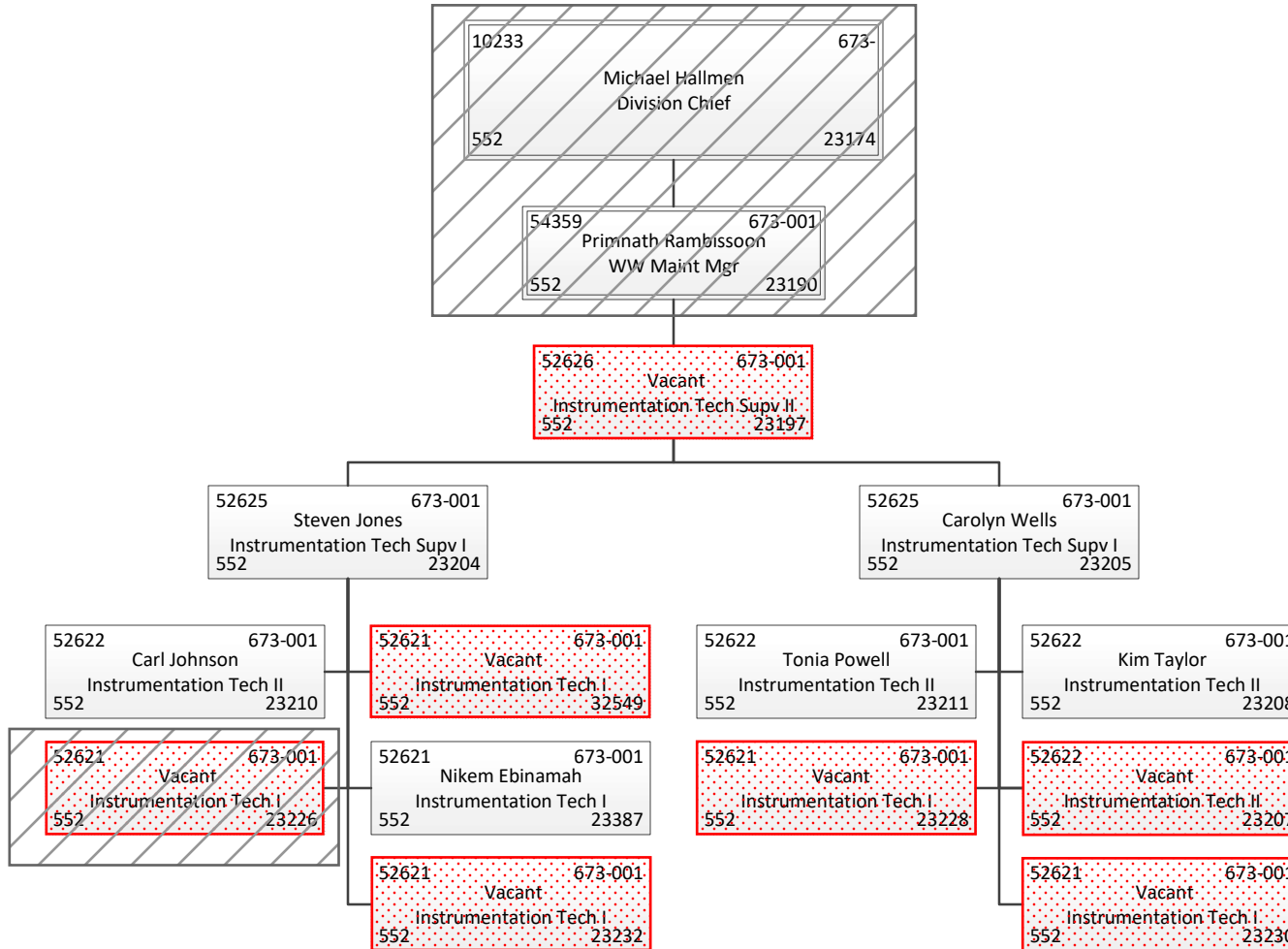


Vacancy Percentage: 9/58 - 16%

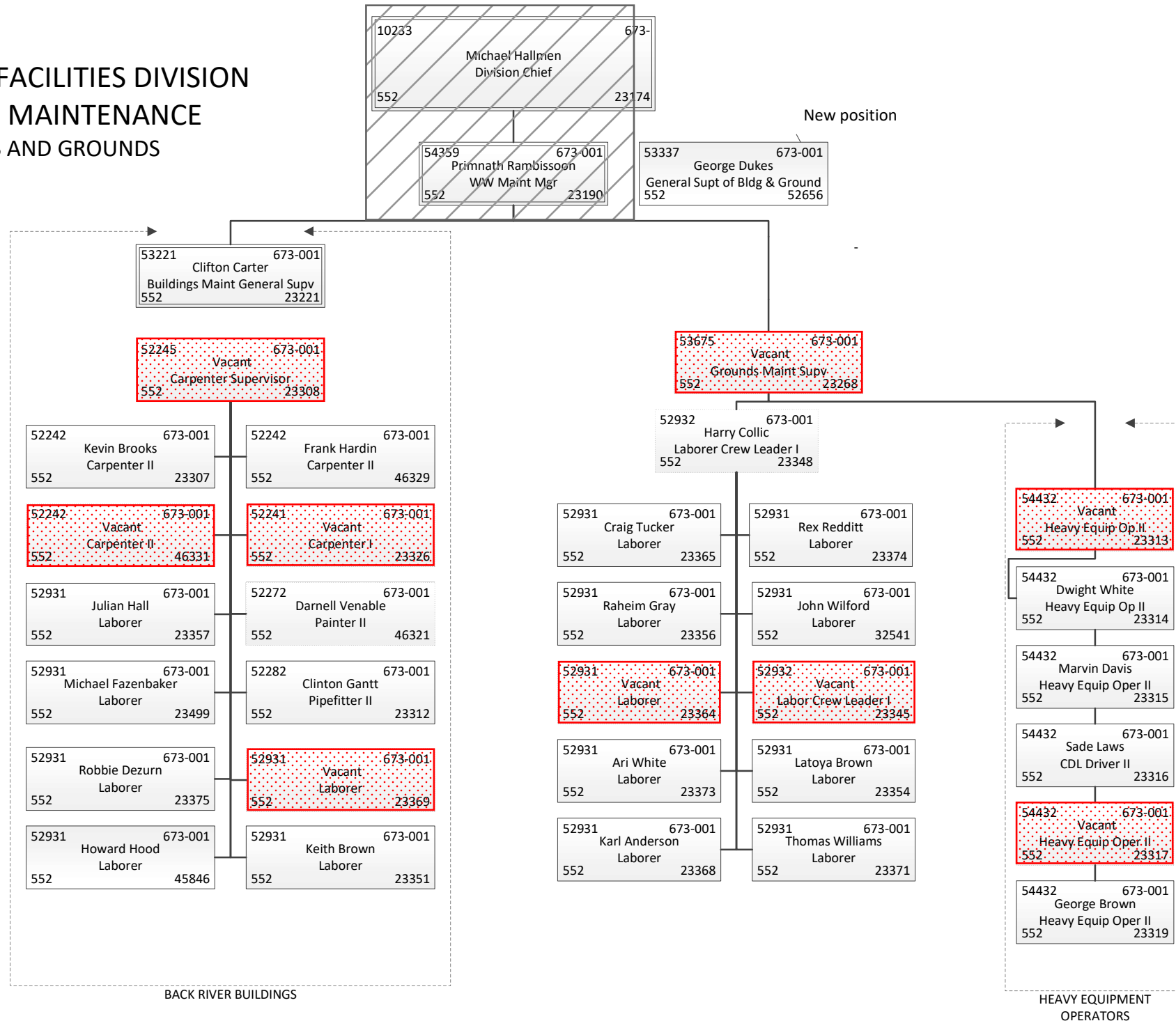
WASTEWATER FACILITIES DIVISION BR OPERATIONS - WATER



WASTEWATER FACILITIES DIVISION BACK RIVER MAINTENANCE INSTRUMENTATION 673-001



WASTEWATER FACILITIES DIVISION BACK RIVER MAINTENANCE BUILDINGS AND GROUNDS



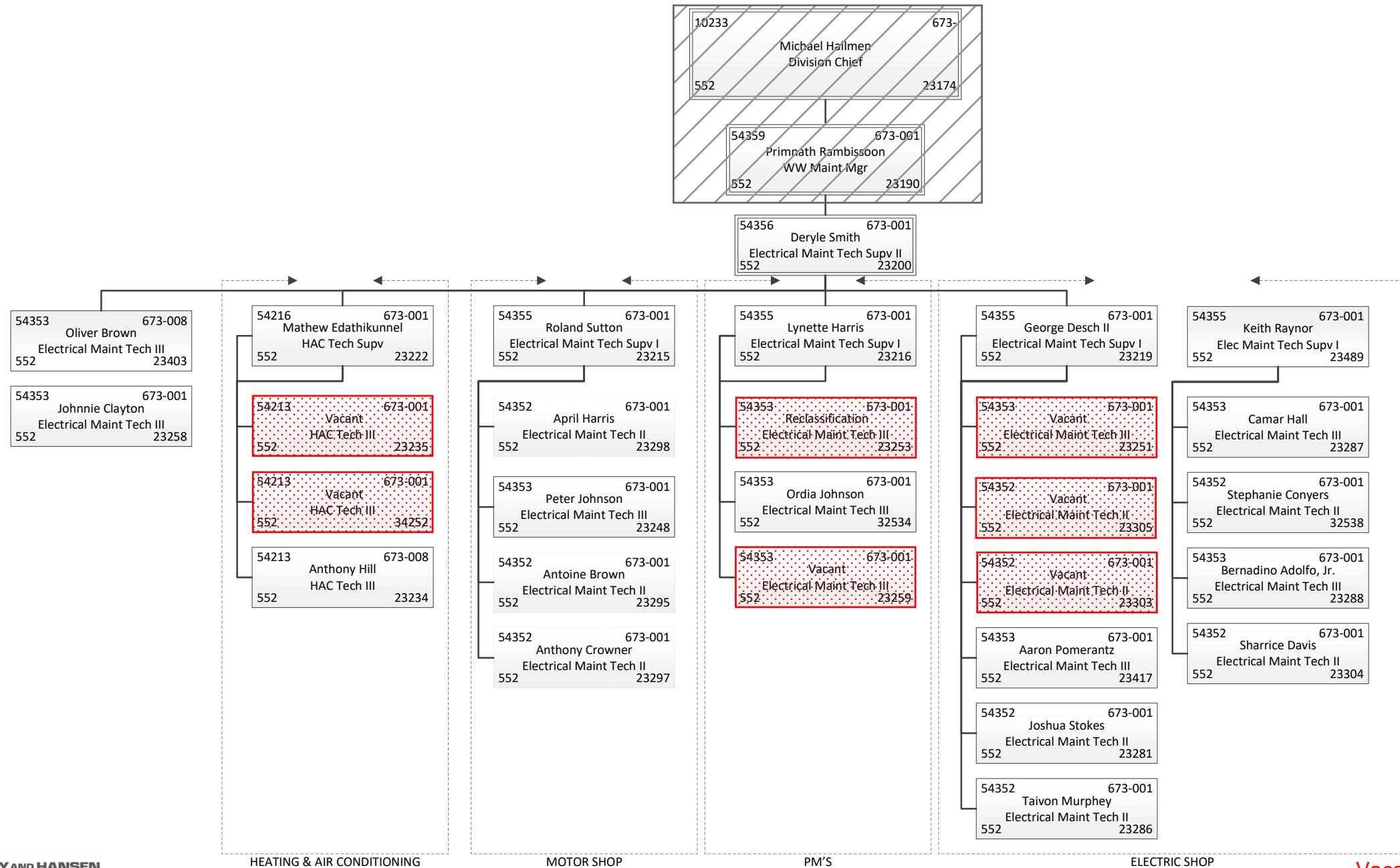
BACK RIVER BUILDINGS

HEAVY EQUIPMENT OPERATORS

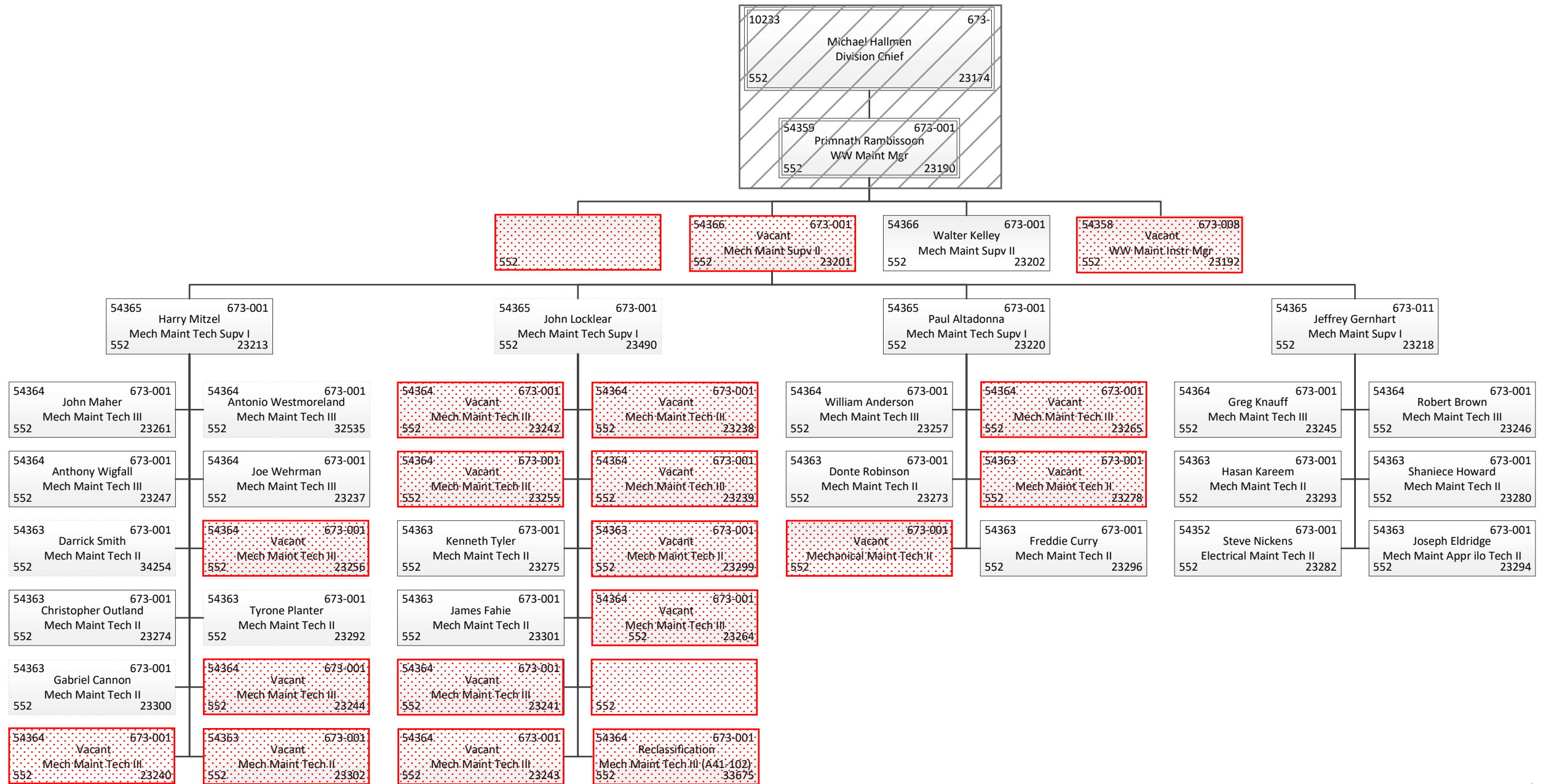
WASTEWATER FACILITIES DIVISION

BACK RIVER MAINTENANCE

ELECTRICAL MAINTENANCE

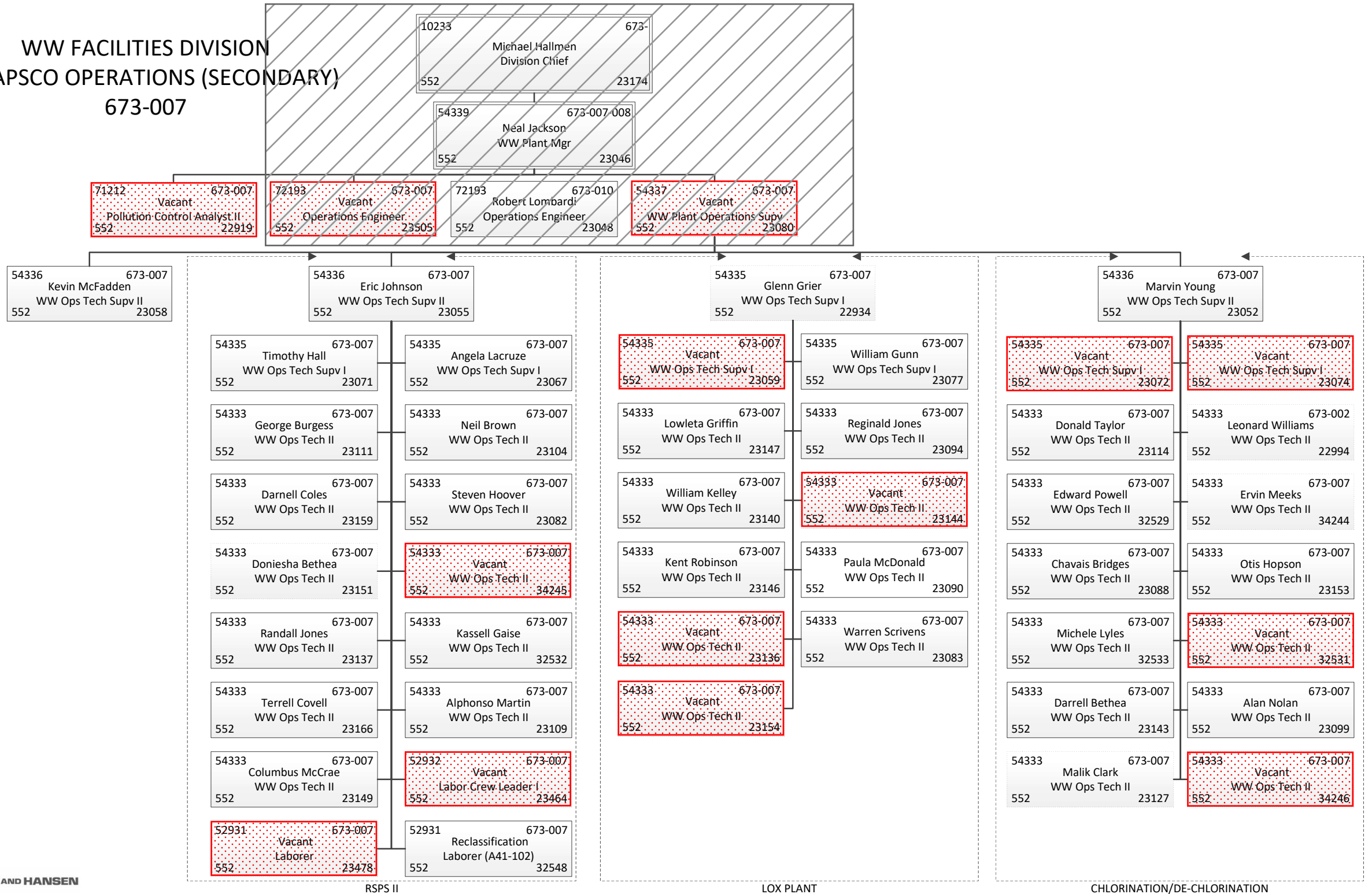


WW FACILITIES DIVISION BACK RIVER MECHANICAL MAINTENANCE 673-001

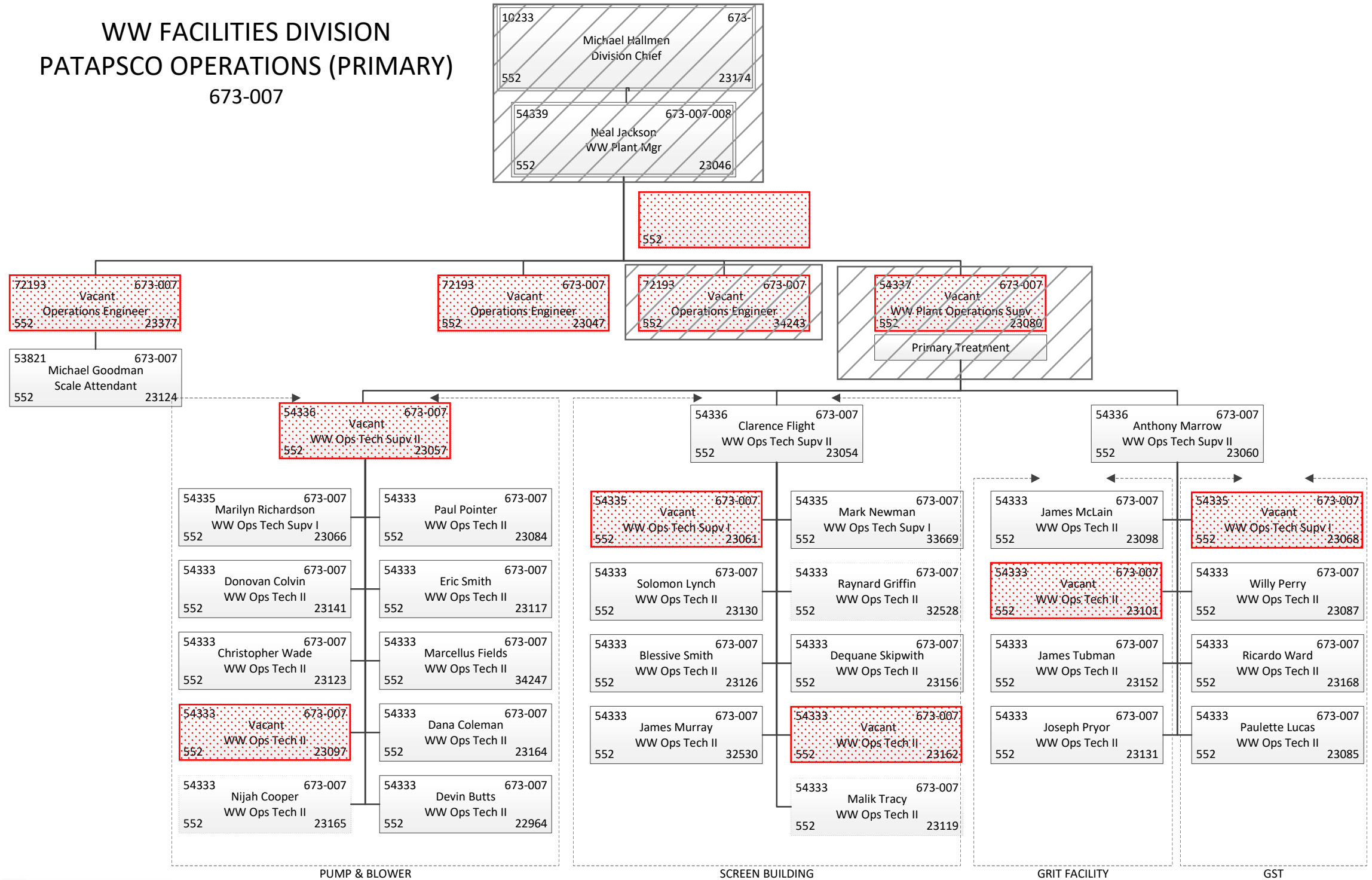


Vacancy Percentage: 20/44 - 45%

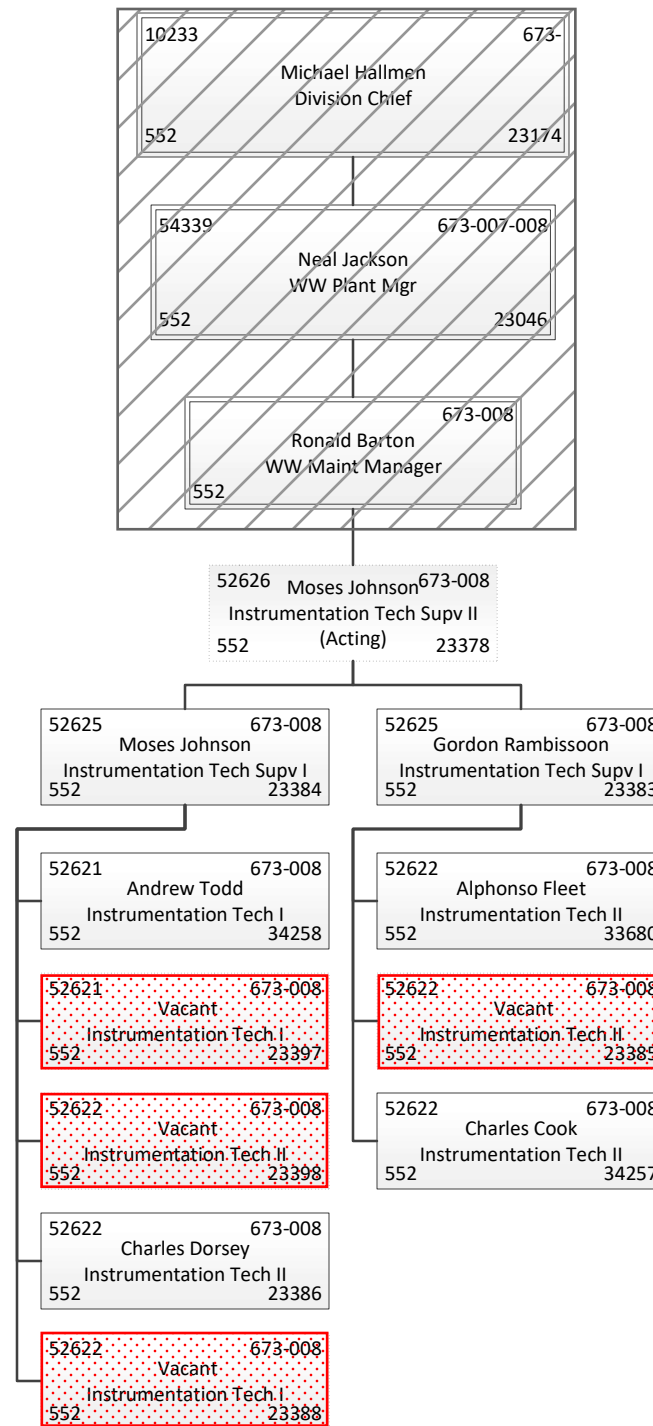
WW FACILITIES DIVISION PATAPSCO OPERATIONS (SECONDARY) 673-007



WW FACILITIES DIVISION PATAPSCO OPERATIONS (PRIMARY) 673-007

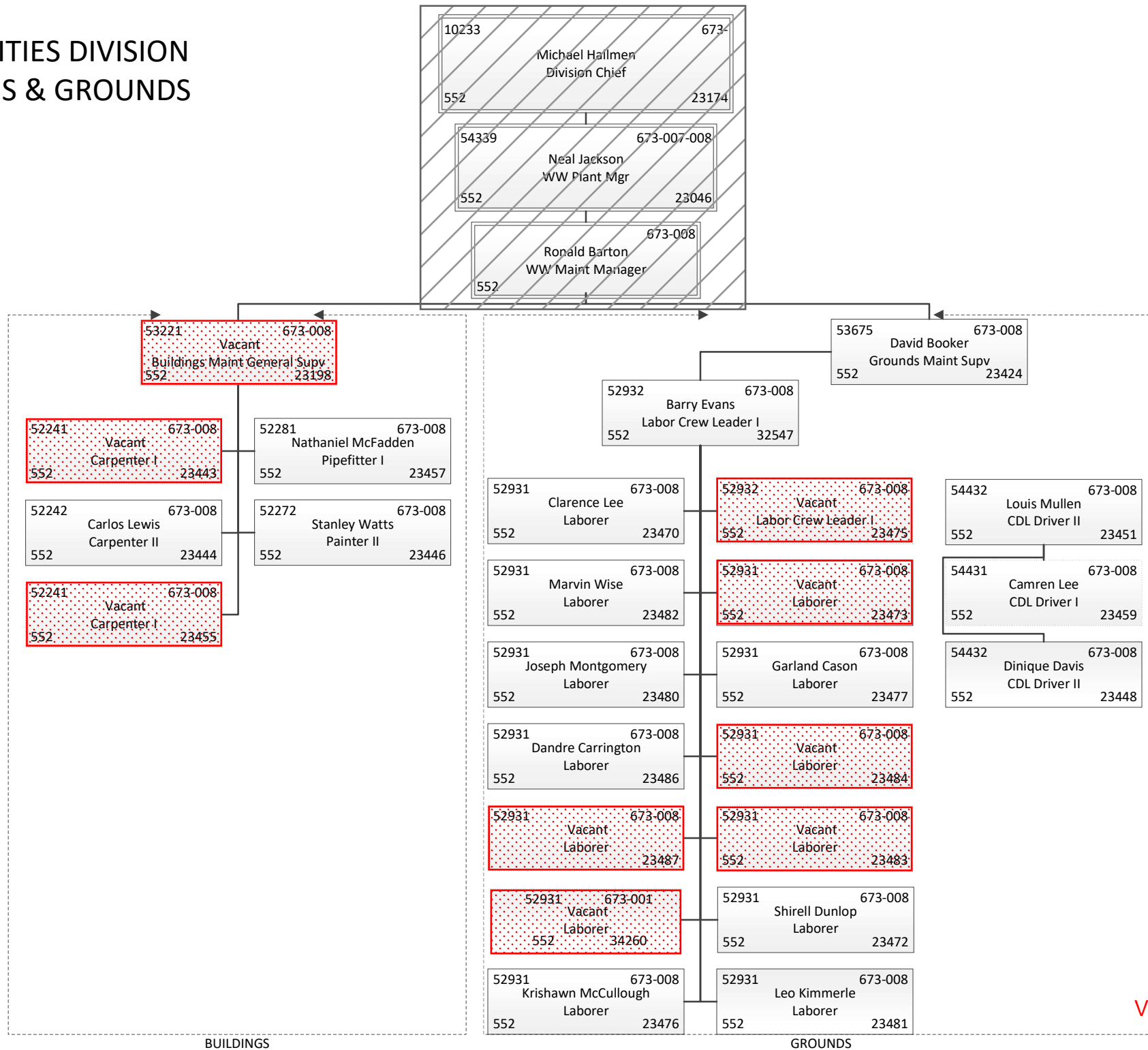


WASTEWATER FACILITIES DIVISION
 PATAPSCO INSTRUMENTATION
 673-008



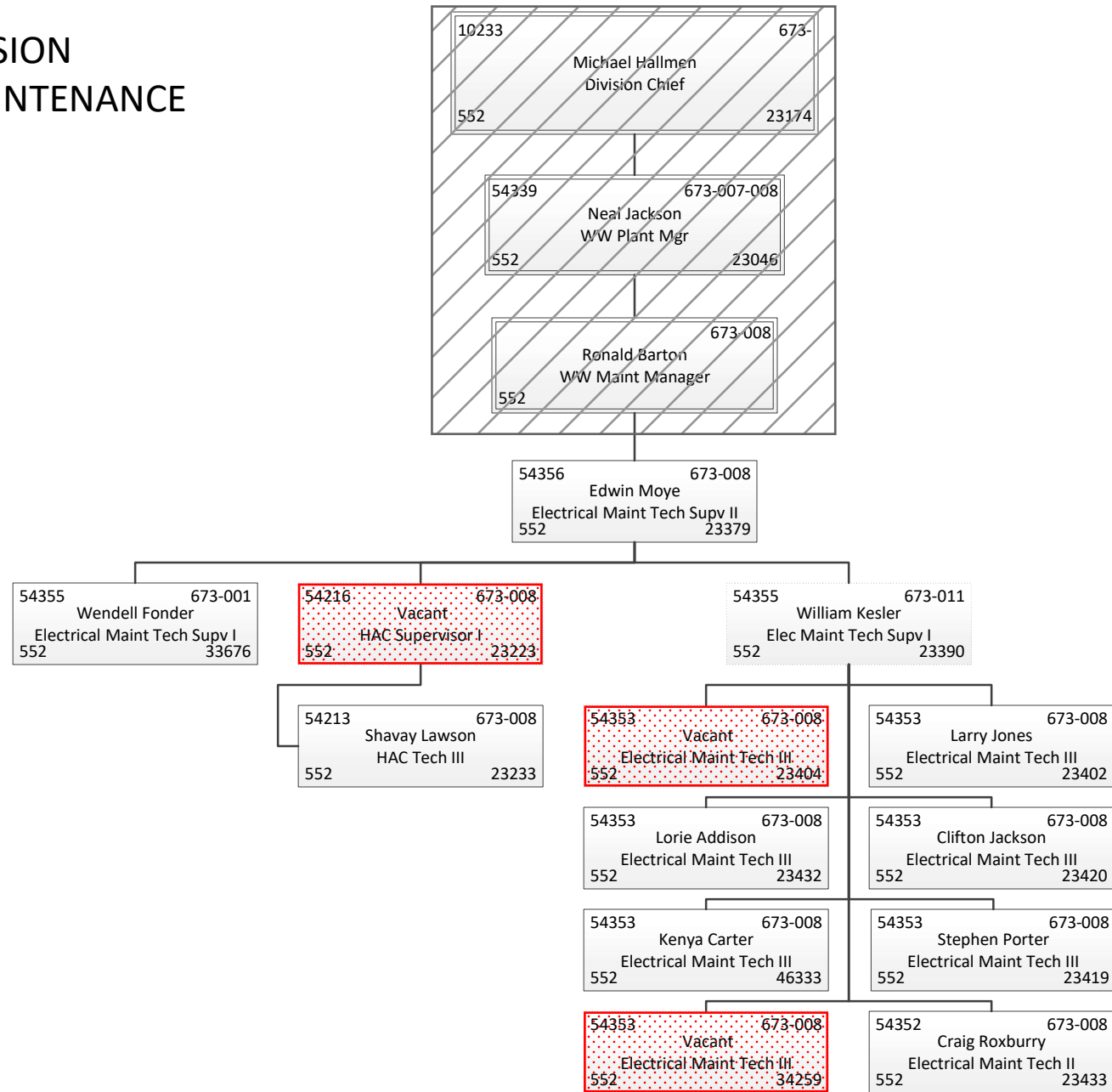
Vacancy Percentage: 4/11 - 36%

WASTEWATER FACILITIES DIVISION PATAPSCO BUILDINGS & GROUNDS 673-008



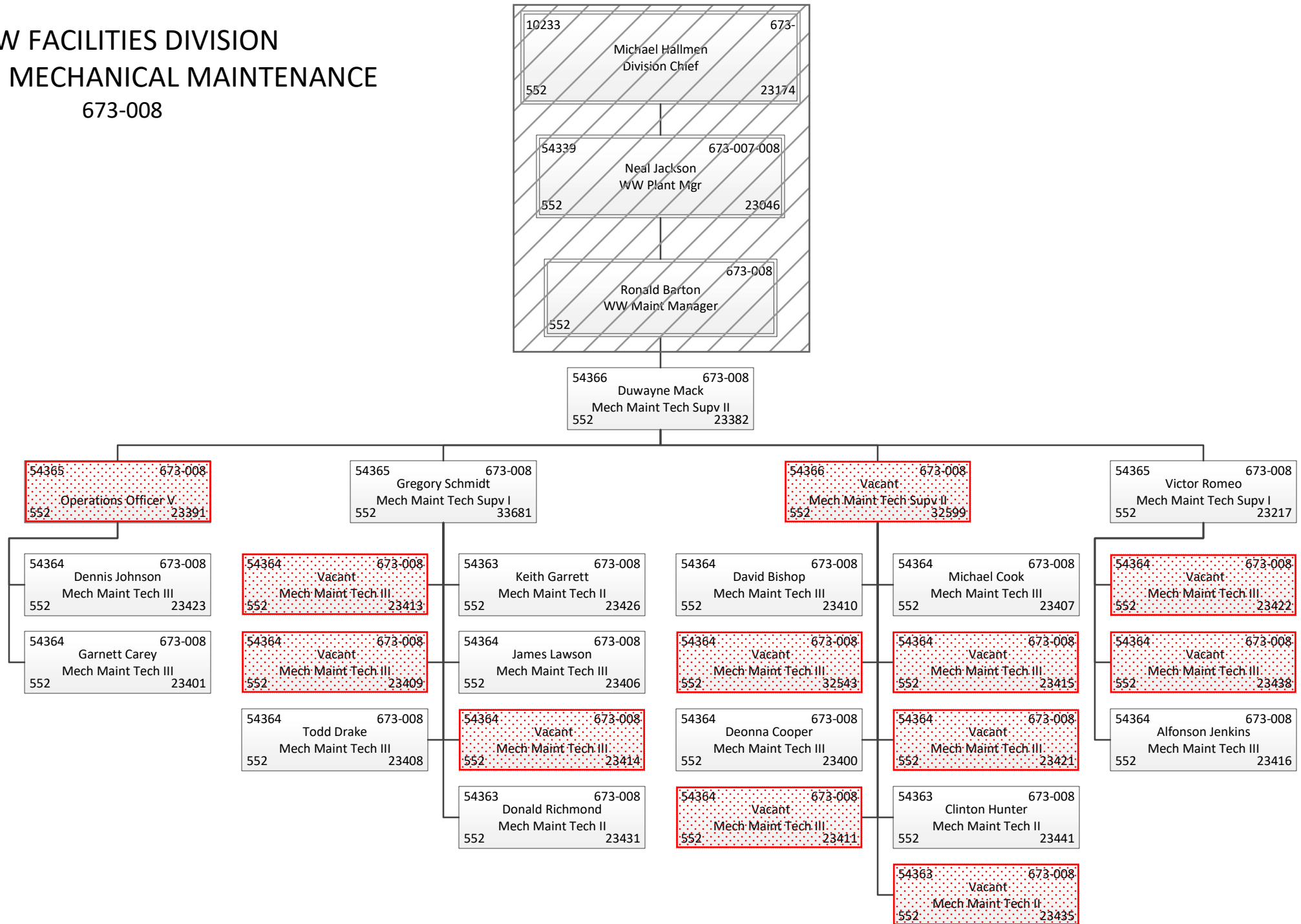
Vacancy Percentage: 9/25 - 36%

WW FACILITIES DIVISION
 PATAPSCO ELECTRICAL MAINTENANCE
 673-008



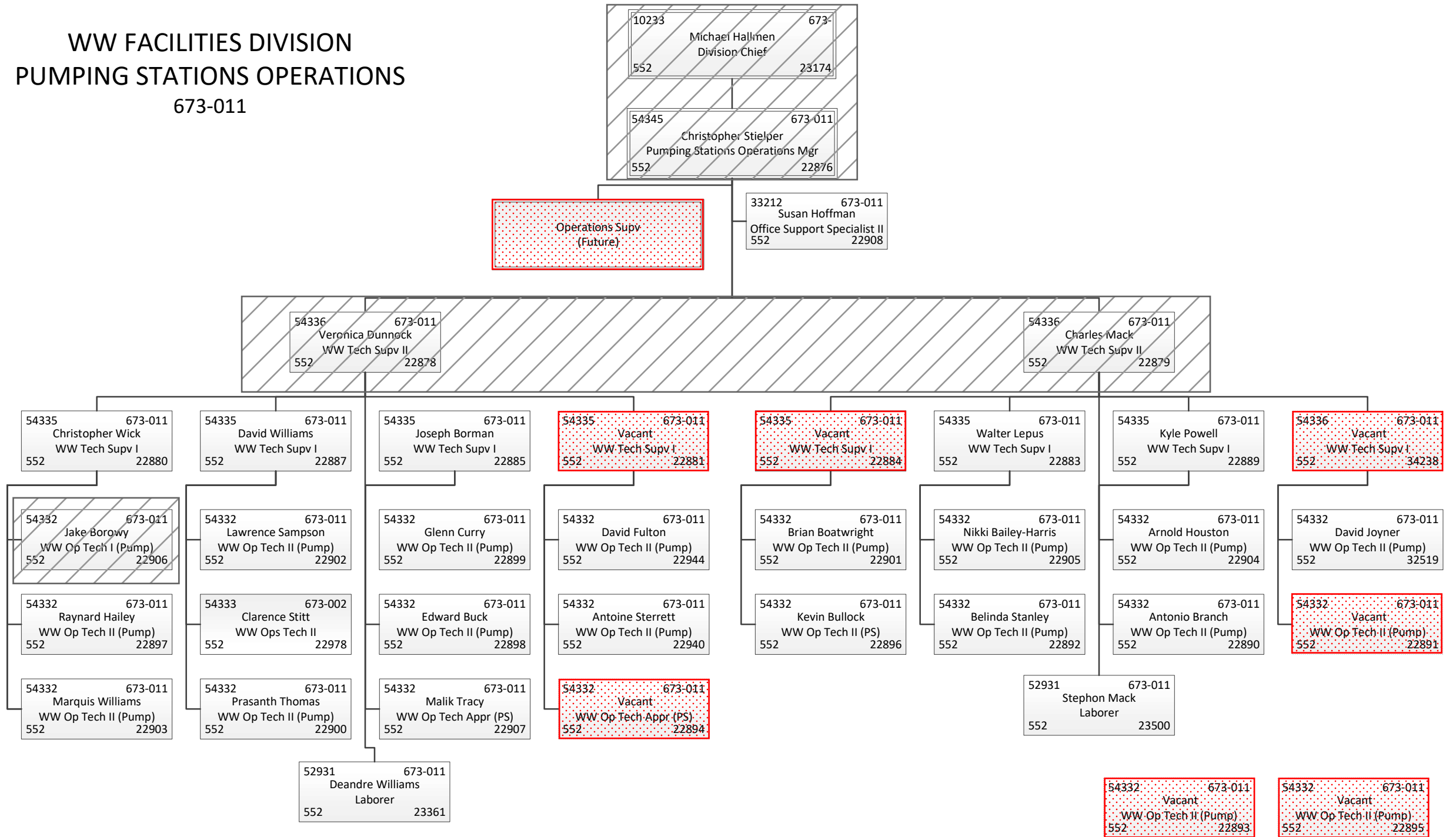
Vacancy Percentage: 3/13 - 23%

WW FACILITIES DIVISION PATAPSCO MECHANICAL MAINTENANCE 673-008



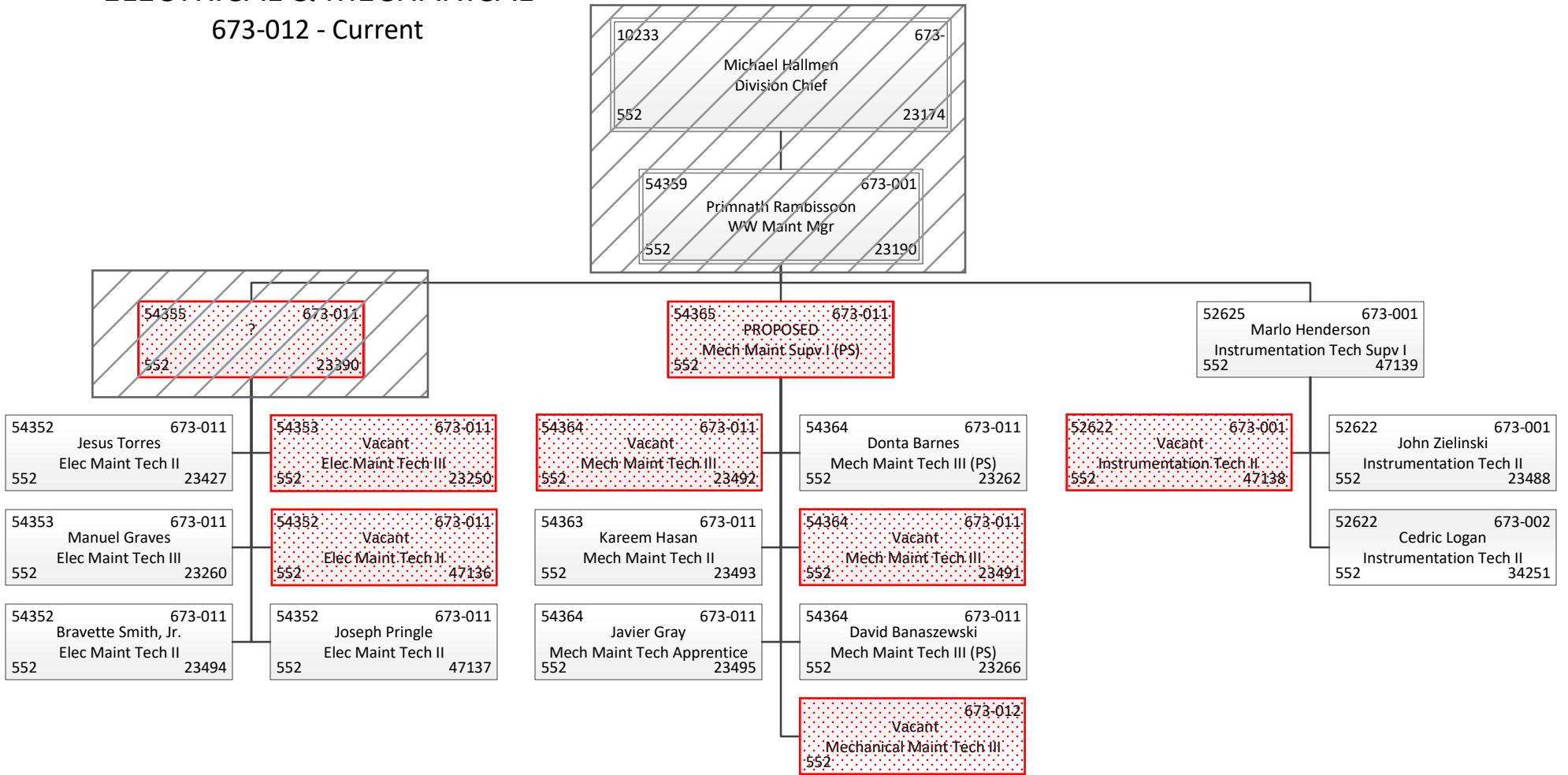
Vacancy Percentage: 12/26 - 46%

WW FACILITIES DIVISION PUMPING STATIONS OPERATIONS 673-011

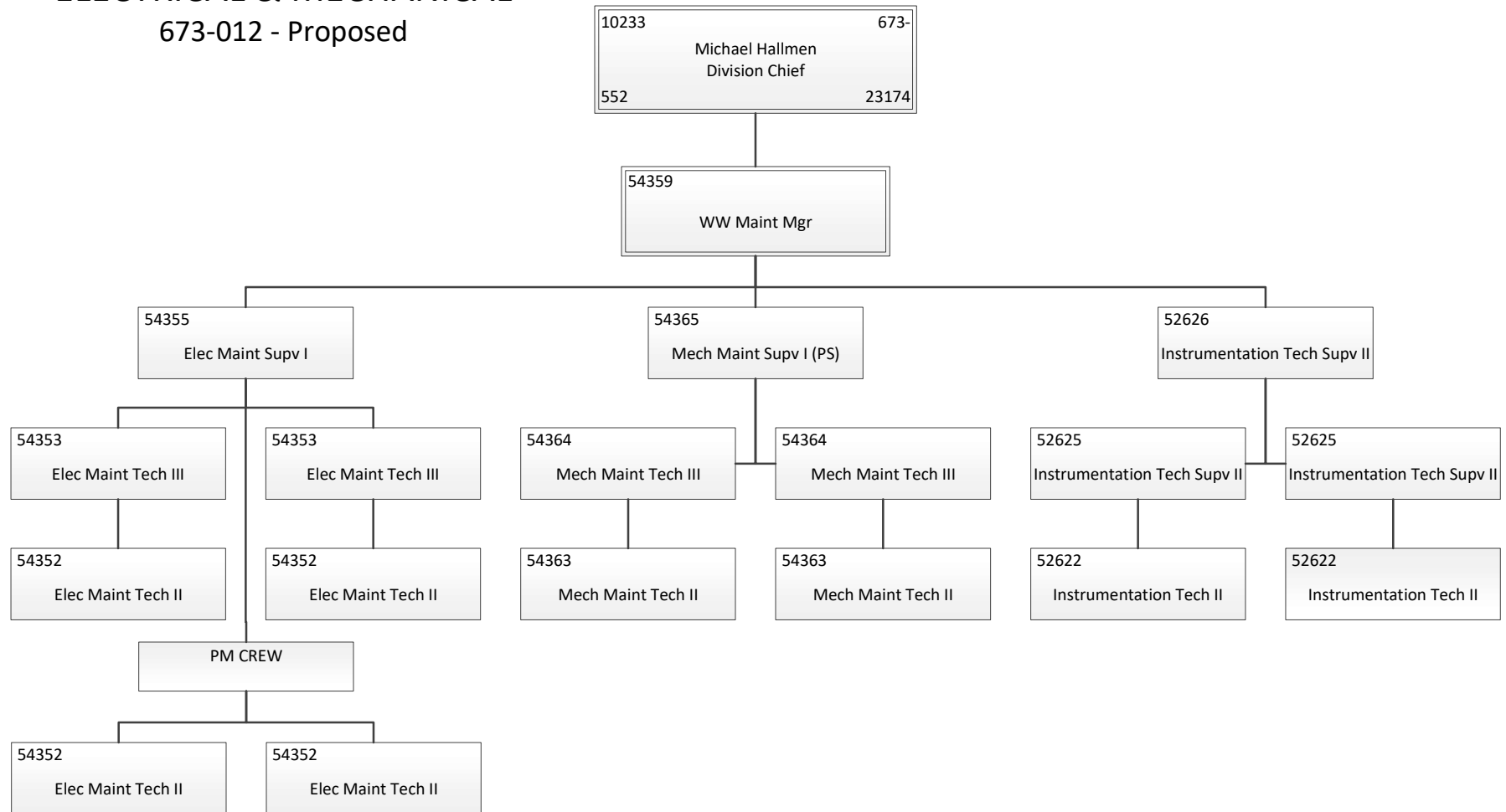


Vacancy Percentage: 8/33 - 24%

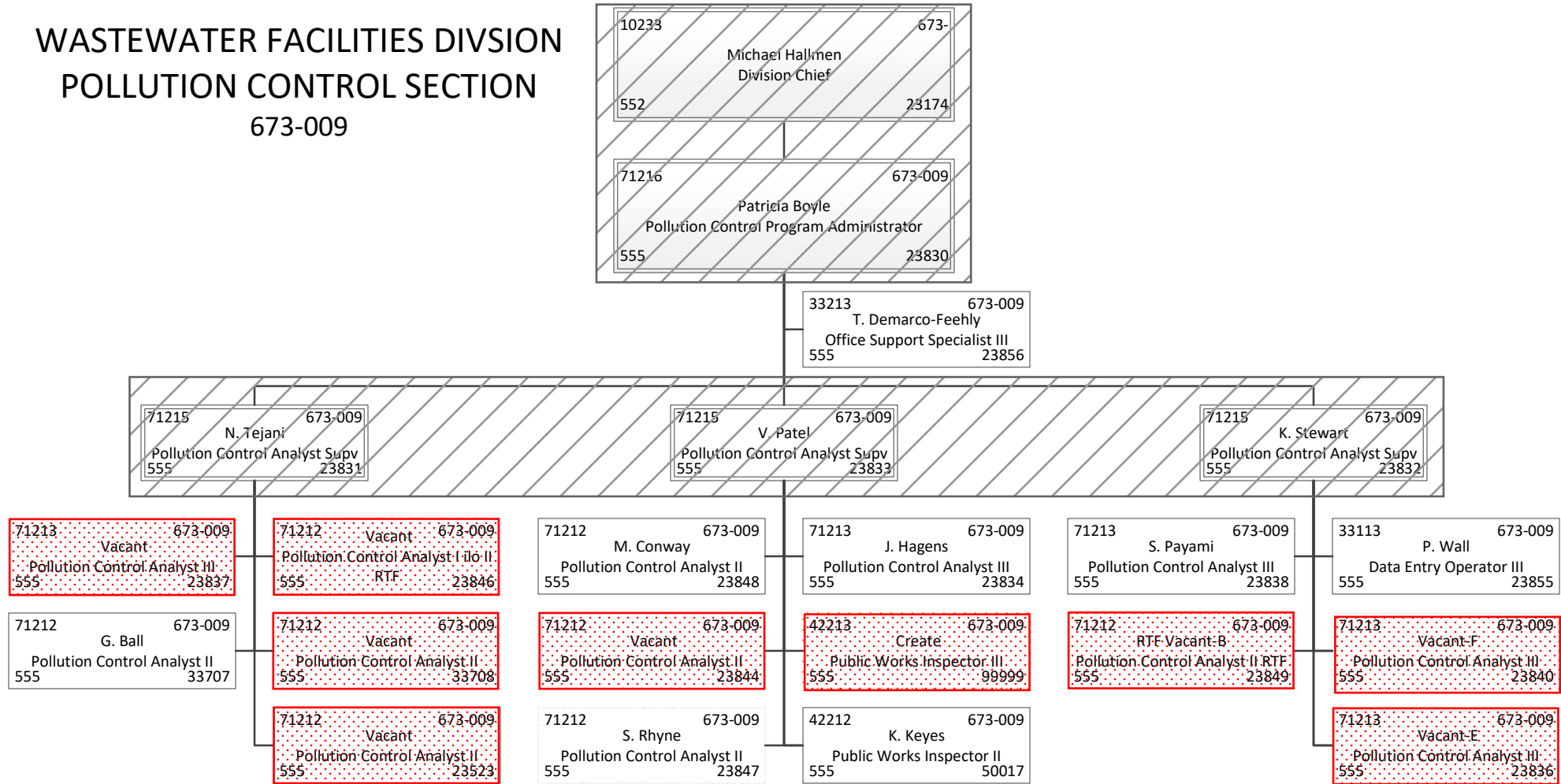
WW FACILITIES DIVISION PUMPING STATIONS MAINTENANCE ELECTRICAL & MECHANICAL 673-012 - Current



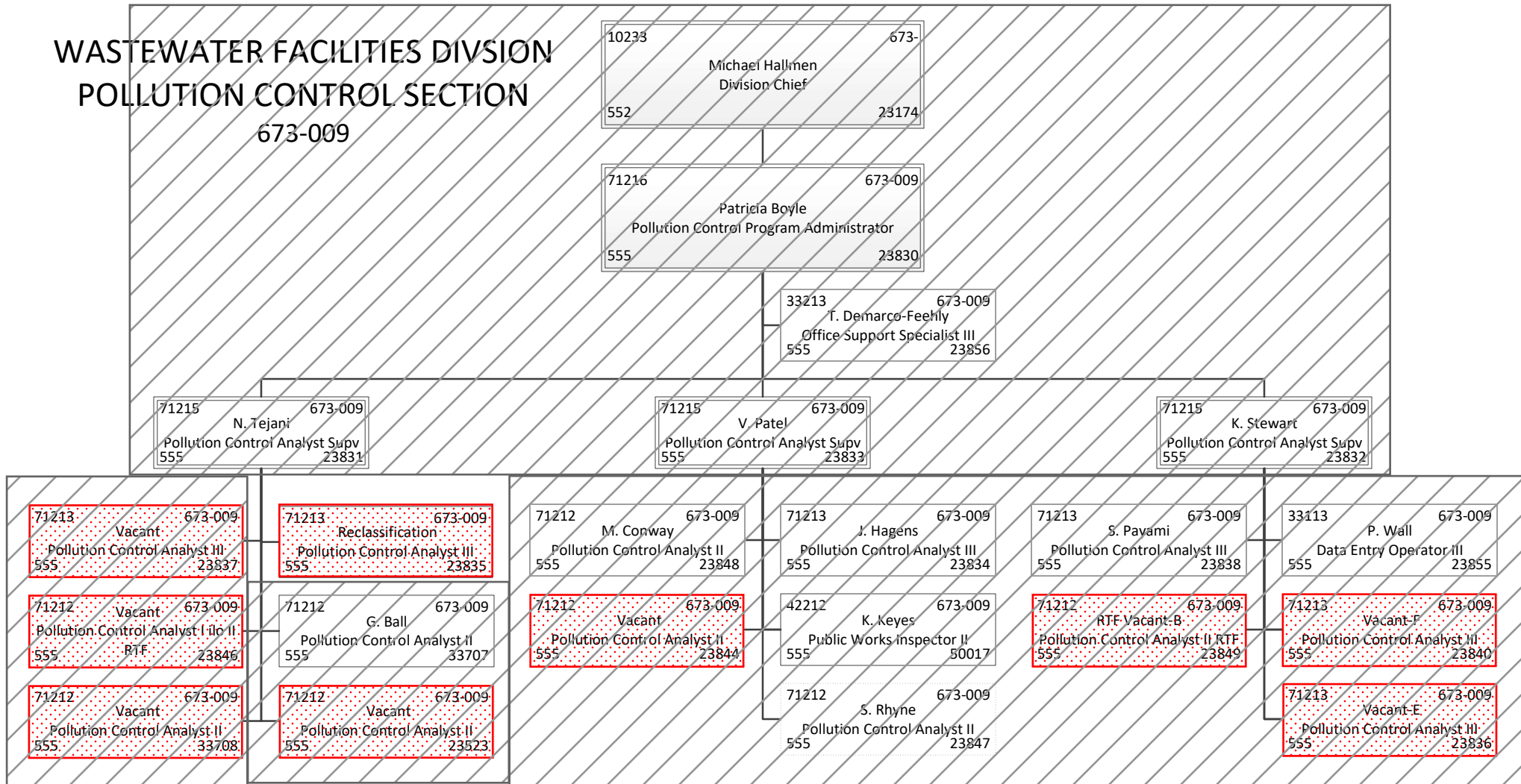
WW FACILITIES DIVISION PUMPING STATIONS MAINTENANCE ELECTRICAL & MECHANICAL 673-012 - Proposed



WASTEWATER FACILITIES DIVISION
 POLLUTION CONTROL SECTION
 673-009



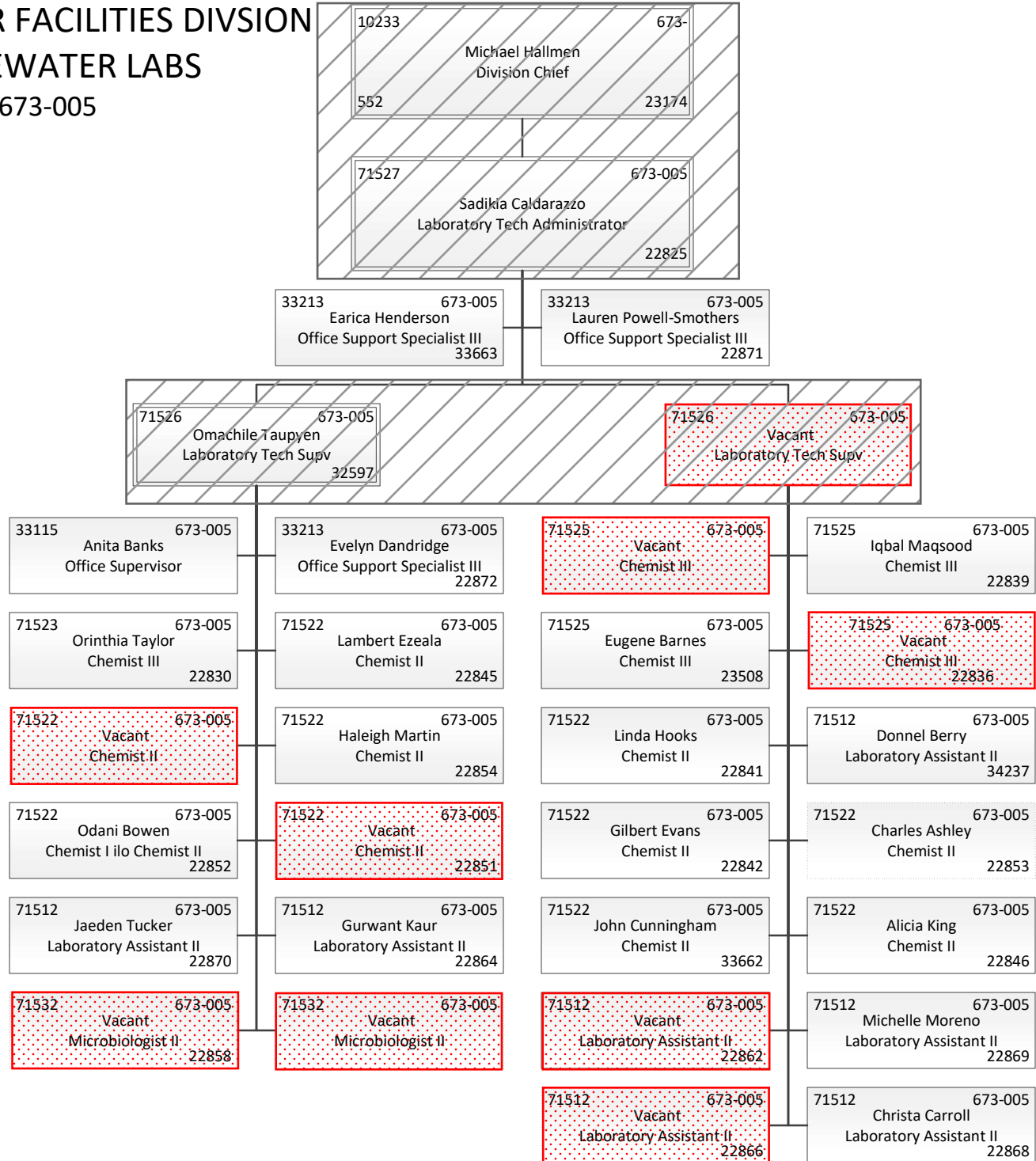
**WASTEWATER FACILITIES DIVISION
POLLUTION CONTROL SECTION
673-009**



WASTEWATER FACILITIES DIVISION

WASTEWATER LABS

673-005





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