COLORADO
Department of Public Health & Environment

October 29, 2026

Matthew Dunston
Walden Water and Sanitation District
PO Box 170
Monument, CO 80132

Subject: Process Design Report Approval
Regulation 22 Site Location Approval No. 259481
Walden Water and Sanitation District, New MBR Wastewater Treatment Plant
Colorado Discharge Permit System (CDPS) No. COX631032
El Paso County
ES Project No. 259956

Dear Matthew Dunston:

The Water Quality Control Division (Division), Engineering Section has received and reviewed the Process Design Report (PDR) including preliminary plans, and PDR Checklist for the Walden Water and Sanitation District's New MBR Wastewater Treatment Plant.

This PDR approval does not constitute approval for construction. Walden Water and Sanitation District must submit a self-certification form when the final design documents are complete. Please refer to items 1 and 2 of the *Conditions of Approval* section of this letter for specific requirements associated with the acceptance of the self-certification form.

The PDR submittal, as reviewed, meets the requirements of the *State of Colorado Design Criteria for Domestic Wastewater Treatment Works, WPC-DR-1* (Design Criteria) and is hereby approved as listed below. **The approved maximum month hydraulic and organic design capacities are 0.15 MGD (peak hourly flow 0.6 MGD) and 375 lbs of BOD per day, respectively.**

This PDR approval addresses the following:

1. Calculations and associated information included in the PDR.
2. Existing treatment plant will be decommissioned and removed upon completion/startup of the plant described below.
3. Influent Compliance Point: location
    a. Influent flow measurement for permit compliance is performed using an open channel Parshall flume and ultrasonic flow sensor prior to the influent equalization (EQ) tank. Continuous flow recording and totalizing is provided to monitor influent flow rates.
    b. Influent flow sampling is monitored at the gravity flow splitter before entering the Wastewater Treatment Plant
4. Equalization:
    a. Equalization Tank:
        i. Two (2) concrete, below grade tanks, one per train, design 23.25 ft x 16 ft x 10 ft SWD, operating volume 27,800 gallons.
        ii. Water level monitored by level transmitter with low & high level alarm.
    b. Grit Removal:
        i. Grit loading and removal within membrane manufacturer's design window requirements, HRT at MMADF 8.9 hours. See Deviations No. 1 and 2.
        ii. Accumulated grit in equalization tank bottom manually removed and disposed offsite.
        iii. Coarse bubble diffusers for low energy mixing and to prevent septic conditions.
        iv. EQ blower: two (2) regenerative blowers (2 duty, 1 per train), 115 SCFM at 5.5 psig, constant speed. Blower operation monitored with pressure and temperature gauge.
    c. Equalization Pumping:
        i. Four (4) submersible pumps (1 duty, 1 standby per train) convey equalized wastewater flow to the fine screens (design basis: 78 gpm at 19.5 feet TDH, constant speed).
5. Preliminary Treatment:

a. Coarse Screening: One (1) automatic coarse bar with automatic collection and bagging capabilities (Duperon Dual Auger, 0.71 inch openings, 0.5 hp motor)
    i. Located upstream of equalization tanks and flow diversion manholes
    ii. If coarse screen were to fail, influent flow and screenings would fall into the wet well while the mechanical components were repaired/replaced. Wet well would then be manually cleaned.
    iii. Screenings discharged through a solids chute to a waste receptacle with a solids collection bag.
b. Fine screening: Two (2) mechanically cleaned, rotary brush fine screens (design basis: Marathon G-829 Rotary Screen, 2 mm perforated openings, 0.5 hp motor).
    i. Located downstream of equalization tanks.
    ii. Overflow: gravity bypass flows are directed to the floor drain and returned to the equalization basin.
    iii. Fine screen gravity discharges to pre-anoxic treatment tank.
    iv. Maintain fine screen critical shelf spares.
    v. Screenings discharged into a bin.
    vi. Odor control: head works building forced ventilation through activated carbon vessels.

6. Secondary Treatment
    a. Acceptance of biological design calculations for reduction of BOD and nitrification of ammonia with a membrane bioreactor (MBR) treatment process. Treatment processes include an aeration tank, MBR filtration, MBR blowers, Waste Activated Sludge (WAS) pumps and permeate pumps. Based on the process modeling, which uses maximum month flow (MMF) and maximum month loading (MML) to the secondary process, the design mixed-liquor suspended solids (MLSS) concentration is 8,000 mg/L and the total solids retention time (SRT) is calculated at 13.9 days with a design minimum temperature of 10.0 ºC. Design influent characteristics:
        i. TKN – 60 mg/L
        ii. Total phosphorus – 10 mg/L
        iii. BOD – 300 mg/L
        iv. TSS – 300 mg/L
    b. Design effluent targets
        i. BOD – <5 mg/L
        ii. TSS – <5 mg/L
        iii. Ammonia NH_3-N - <1 mg/L
        iv. Phosphorus – 0.1 mg/L
    c. The dual parallel process basins are housed below the treatment building container and include a minimum 18 inches of freeboard. Process basins consist of the following:
        i. Pre-Anoxic Basin:
            1. Two (2), in-ground tanks, one (1) per train, design 16 ft x 16 ft x 10 ft SWD, working volume 19,150 gallons for each train.
            2. HRT at MMADF: 6.1 hours, total for both trains
            3. Mixing System
                a. Three (3) submersible mixers (1 duty per train, 1 shared shelf spare) (design basis: Grundfos SMD.23.10 .1750.T.6.0H).
            4. Mixed liquor return (MLR) pumps
                a. Four (4) submersible pumps (1 duty, 1 standby per train) (design basis: 208 gpm at 21 ft TDH) provide nitrified recycle flow from posterior side of aerobic basin to anterior portion of pre-anoxic basin.
            5. Tank overflows to equalization tank. Hydraulic connection between pre-anoxic, aeration, and MBR tanks.
        ii. Aerobic basin:
            1. Two (2) in-ground tanks, one (1) per train, design 32.3 ft x 16 ft x 10 ft SWD, working volume of 38,700 gallons for each train.
            2. HRT at MMADF 12.4 hours, total for both trains
            3. DO target: 2.0 mg/L
            4. Aluminum sulfate and sodium hydroxide are added to the return activated sludge (RAS) piping entering the aeration basin.
        iii. Process Aeration:
            1. Five (5) positive displacement type process air blowers (2 duty per train, 1

shared shelf spare) (design basis: 220 scfm at 5.4 PSI).
2. Blowers monitored by pressure and temperature gauge.
3. AOR: 660.4 lbs O2/day, based on 1.3 lbs O2/lbs BOD and 4.6 lbs O2, N-NH4
4. SOR: 2,589.2 lbs O2/day (summer condition)
5. Diffusers: fine bubble (design basis: FlexAir Duplex MP3)
6. Alpha: 0.5 / Beta: 0.95
7. OTE: 1.65%/ft
8. Required Airflow: 874.2 scfm

iv. Postanoxic basin:
1. Two (2) in-ground tanks, one (1) per train, design 7.25 ft x 11.25 ft x 10 ft SWD, working volume of 6,100 gallons for each train.
2. HRT at MMADF: 2.0 hours, total for both trains
3. Mixing system
a. Three (3) submersible mixers (1 duty per train, 1 shared spare) (design basis: Grundfos SL1.30.A.30.30.EX.4.61R.C)

v. Membrane Feed Pumps:
1. Four (4) submersible pumps (1 duty, 1 standby per train) convey aerated wastewater flow to the membrane bioreactor (design basis: 260.4 gpm at 27 ft TDH, constant speed)

7. Membrane Filtration
a. MBR Filtration:
i. Two (2) in-ground tanks, one (1) per train, design 5.83 ft x 6.66 ft x 6.89 ft SWD, working volume 1,729 gallons. Tanks are housed above grade in the treatment building container.
ii. Membrane tank monitored by temperature transmitter and level switch low and high.
iii. Total HRT at MMADF: 0.64 hours (not including recycle rates)
iv. Membranes are hollow fiber ultrafiltration membranes consisting of 24 modules per tank (design basis: Veolia ZeeWeed 500S).
v. Membrane module area: 300 sqft/ea, 24 modules per tank (total 7204 sqft).
vi. Design net flux at forward flow: 10.4 gfd/sqft at MMADF
vii. Sludge return and wasting:
1. As the membrane feed pumps convey mixed-liquor to the membrane tank in excess of the forward flow (260.4 gpm), the permeate pumps draw the permeate through the membranes, and the remainder of the flow or RAS is returned to the aerobic basin by gravity through an overflow pipe. The RAS flow is controlled indirectly by adjusting the flow of the permeate pumps. Design rate of 4.0 x MMAF.
2. WAS is removed from the bottom of the membrane tank and conveyed by gravity to the sludge holding tank. Wasting is controlled by an automatic control valve and managed through MBR control panel and WAS volume set point. WAS volume is measured using a magnetic flow meter.

b. Membrane scour blowers:
i. Three (3) installed regenerative type blowers (1 duty per train, 1 shelf standby) (design basis: 120 SCFM/each at 4.0 psig), constant speed.
c. Permeate Pumps:
i. Four (4) installed centrifugal pumps (1 duty, 1 standby for each train) (design basis: 86.8 gpm at 57.5 ft TDH), variable frequency drive.
d. Membrane cleaning:
i. Membrane system has the ability to perform backpulses and maintenance cleans. For backpulse, disinfected effluent stored in the 178 gallon backwash tank is directed through the membranes using two (2) centrifugal pumps (1 duty, 1 standby) (design basis: 57.9 gpm at 22 ft TDH), with variable frequency drive. For maintenance cleans, sodium hypochlorite and/or citric acid may be added for the clean-in-place process. The available storage volume in the equalization basin allows the membranes to be offline during backpulses and maintenance cleans.

8. Chemical Addition:
a. Sodium Hydroxide (caustic soda), 50% solution strength
i. Feed pump: 2 duty, 1 for each train, 1 shelf-spare shared with alum feed, 1.7 gph

capacity (design basis: Prominent diaphragm pump)
ii. Chemical storage: 55-gallon drum with secondary containment pallet
iii. Injection location: RAS to aerobic basin
iv. Control: pH feedback from aeration tank.
v. One emergency eyewash station.

b. Aluminum sulfate (alum)
i. Feed pump: 2 duty, 1 for each train, 0.44 gph capacity (design basis: Prominent solenoid diaphragm pump).
ii. Chemical storage: 55-gallon drum with secondary containment pallet.
iii. Injection location: RAS to aerobic basin
iv. Control – flow paced.

c. Micro-C (supplemental carbon):
i. Feed pump: 1 duty per train, 0.58 gph capacity (design basis: Prominent diaphragm pump).
ii. Chemical storage: 55-gallon drum with secondary containment spill pallet.
iii. Control – flow paced.

d. Membrane cleaning chemicals:
i. Citric acid
1. Feed pump: 1 duty, 3.0 gpm capacity (design basis: Shurflo 2088), variable frequency drive.
2. Chemical storage: 55-gallon drum with secondary containment spill pallet.
3. Common shelf spare with sodium hypochlorite feed.
4. Control – automatic injection into membrane tank during membrane backpulse when maintenance clean manually initiated on HMI
ii. Sodium hypochlorite
1. Feed pump: 1 duty, 1 shelf spare, 3.0 gpm capacity (design basis: Shurflo 2088), variable frequency drive.
2. Chemical storage: 55-gallon drum with secondary containment spill pallet.
3. Common shelf spare with Citric acid feed.
4. Control – automatic injection into membrane tank during membrane backpulse when maintenance clean manually initiated on HMI

9. Disinfection Process:
a. Ultraviolet light disinfection:
i. Six (6) closed vessel, non-contacting type UV disinfection reactors (UVPure, Hallett 1000W) installed in parallel triplets in series (3 duty, 3 standby units), located within the treatment building.
ii. Validated delivered dose capacity for a minimum dose of 30 mJ/cm^2 to wastewater effluent with a minimum UV transmittance of 65 percent and at a maximum flow rate of 173.6 gpm.
iii. Hydraulics: water level through reactors maintained by vertical installation of reactors and discharging the disinfected effluent from the top of the reactors.
iv. Quartz sleeve cleaning: automatic wiping system.
v. Monitoring: UV intensity (measured dose).
vi. Alarm conditions include failure of a lamp, high temperature, low UV dose, and power outage. Discrete dry-contact alarm output.

10. Effluent Compliance Monitoring:
a. Flow Measurement:
i. Two (2) magnetic flow meters, one per train (design basis: 2-inch magnetic meter, 0 – 160 gpm capacity), installed between the permeate pumps and the UV disinfection zone. Continuous flow recording and totalizing is provided to monitor effluent flow rates.

b. Effluent sampling:
i. The point of compliance for the treated effluent surface discharge immediately downstream of the UV disinfection system.

11. Waste Solids Handling:
a. Solids stabilization
i. Sludge holding tank:
1. One (1) WAS holding tank, 33.1 ft x 17.1 ft x 10 ft SWD, working volume 42,600

gallons.
2. Coarse bubble diffuser tube for low energy mixing and to prevent septic conditions.
    a. WAS blower: two regenerative blowers (1 duty, 1 standby), 185 SCFM at 5.9 psig, constant speed.
    b. Blowers monitored with pressure and temperature gauges.
3. Anticipated wasting 5,811 gallons per day (at 2% solids) at the MMADF design condition.
4. Two (2) submersible decant pumps (1 duty, 1 standby) pumped to influent equalization tanks, after influent sampling point (design basis: 61.9 gpm capacity at 20 ft TDH), constant speed.

12. Ancillary Equipment:
    a. Emergency Facilities:
        i. Primary power is supplied to the site by the local electric utility.
        ii. Secondary power supplied by new emergency back up diesel or liquid propane generator. Automatic transfer switch will activate the generator in the event of a primary power source failure. Backup generator sufficient to power equipment inside treatment building and lift station.
    b. Instrumentation and Control Systems
        i. MBR control panel allows staff to control equipment and monitor the status and alarm conditions of the treatment facility. The telemetry configuration transmits alarm conditions remotely to staff.

This Approval includes the following site specific deviations from the Design Criteria:

- Deviation No. 1: Section 5.4.1(b) of the Design Criteria requires an overflow or bypass to a second grit chamber or redundant flow channel capable of carrying the design peak hour flow, and requires overflow to occur automatically if the grit removal facilities are offline, fail, or become overloaded. The design requests a deviation from the criteria based on the grit chamber doubling as a flow equalization tank. The equalization tank is designed to attenuate peak hour flows, the pumps include redundancy, influent solids are screened through a bar screen prior to grit removal, and the equalization pumps are solids handling style pumps. Gravity separation of solids is not affected by equipment failure. Based on the information provided, the system is granted a deviation from the installed grit system redundancy requirements of Section 5.4.1(b) of the Design Criteria.
- Deviation No. 2: Section 5.4.2(b) of the Design Criteria requires that aerated grit chambers shall be designed with a length-to-width ratio between 3:1 and 8:1, a width-to-depth ratio between 0.8 and 0.9, a minimum hydraulic detention time of 3 minutes at design peak hour flow, sloped floors (e.g., 30 degrees), an inlet or inlet baffles to direct flow perpendicular to the spiral roll pattern, and methods to provide variable air rates (e.g., 3 to 8 standard cubic feet per minute (SCFM) per linear foot). The design requests a deviation from the grit chamber design requirements based on the aerated tank doubling as a flow equalization basin. The membrane manufacturer confirmed that grit loading and grit removal with diffused air mixing and tank HRT is in accordance with their required design window. Based on the information provided, the Division accepts the site-specific deviation for the grit chamber design requirements of Section 5.4.2(b) of the Design Criteria.
- Deviation No. 3: Section 7.5.4(d)(2) of the Design Criteria requires WWTPs with maximum month flows more than 0.1 mgd but less than 1 mgd, the MBR process must be designed to have at least four membrane tanks, assuming two aeration basin process trains. The design requests a deviation from the criteria based on the proposed package including two independent treatment trains, each with one membrane tank rated to treat the maximum month flow of 150,000 gpd. The engineer has confirmed that with either membrane tank or treatment train out of service, the remaining train can treat the maximum month flow. Based on the information provided, the Division accepts the site-specific deviation for the MBR redundancy requirements of Section 7.5.4(d)(2) of the Design Criteria.

Conditions of Approval:

1. In accordance with Regulation 22, Section 22.13 (1, par. 3), **upon completion of final design (plans and specifications) documents, including all addenda, and prior to commencement of construction**, each Colorado registered professional engineer(s) in responsible charge of the final design documents (plans & specifications) shall complete and submit a Self-Certification Form to the Division.

2. In accordance with Regulation 22, Section 22.13 (1, par. 4), if the Division discovers discrepancies between the facilities as described in the PDR and those finally constructed, the applicant will either agree to make modifications to resolve the inconsistency to the Division's satisfaction or the approval of the design will be null and void.

3. **Upon completion of construction and prior to commencement of operation**, a written certification must be submitted to the Division stating that the project facilities were built in accordance with the approved plans, specifications, and change orders. The certification must be signed by the applicant's registered engineer. This form is available at https://www.colorado.gov/cdphe/wq-facility-design-and-approval-forms under the "Domestic wastewater construction complete form" heading.

4. Any change orders or addenda that change the treatment plant's capacity, water quality, or processes, must be submitted to this office for review and approval.

5. When construction is estimated to be within 14 days of completion, please notify the Division. A representative of the Division may schedule a site visit to conduct a final construction inspection before the facility commences operations.

6. Please note that during construction and operation activities, the provisions specified in the Design Criteria, Sections 2.2.0, 2.3.17 and 2.3.18, must be implemented and followed. This review does not relieve the applicant/owner from compliance with all Federal, State, and local regulations and requirements prior to construction nor from responsibility for proper engineering, construction, and operation of the treatment plant.

7. No point source discharges of water and/or contaminants from this treatment plant to the waters of the state are authorized during construction unless a permit for such discharges has been issued by the Division. If you have any questions regarding permit issues or requirements, please contact the Permits Section at 303-692-3510.

8. Any discharge from the treatment plant must be covered by a CDPS discharge permit or permit certification which includes the final conditions and discharge limitations that are specific to the treatment plant. A complete application for a new or modified individual discharge permit or general permit certification must be made as soon as possible but at least 180 days prior to the planned date that discharge will commence. Please refer to the Division's Permit Section web page for specific information about the permitting application process. This condition does not prevent installing/constructing the process improvements once design approval is obtained from the Division.

9. Changes to the design as a result of a new/renewed permit, permit certification or WQPT may require submission of a revised site location application and design review submittal.

10. The applicant/owner must be aware that added chemicals included in the treatment process will need to be considered under Regulation 61 and the discharge permit. Added treatment chemicals that could significantly change the nature or increase the quantity of pollutants discharged will be evaluated by the Permits Section and may result in additional or modified effluent limitations in the next permitting action. The chemical evaluation process is part of the permit application/routine review and is separate from the site location application and design review, and does not prevent installation/construction of the treatment process once design approval is obtained from the Division. The permittee is encouraged to begin the evaluation and coordinate with the Permits Section as soon as the treatment plan and chemicals are known. Please refer to the Division's Permit Section web page for specific information about the permitting application and chemical evaluation processes. If the chemical evaluation results in the addition of effluent limitations and subsequent modification to the treatment process, then a site location application and design review submittal amendment may be needed.

11. In accordance with the Design Criteria, Section 2.4.0, all treatment plants shall develop suitable operations and maintenance manuals.

12. In accordance with Chapter 11 of the Design Criteria, all treatment plants shall develop management and operating plans for ultimate use or disposal of biosolids. Biosolids management plans shall conform to Federal Requirements in 40 CFR 503. All disposal options shall also conform with Federal Requirements 40 CFR 257 and 40 CFR 503, Colorado Biosolids Regulation 64, and the requirements of the Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities, as applicable.

13. All biosolids and/or similar waste material removed from the project site during the abandonment, demolition, replacement, and/or expansion of any treatment process must be properly disposed at an approved site.

Facility Classification under Regulation 100:

In accordance with the current Operators Certification Board Regulations, this wastewater treatment plant is a Class B Domestic Wastewater Treatment Facility and the collection system is a Class 1 wastewater collection system.

Documents reviewed:

- Site Application for Walden Water and Sanitation District by Apex Companies, LLC dated August 31, 2026.
- Process Design Report for Walden Water and Sanitation District by Apex Companies, LLC dated December 2025.
- Process Design Report Drawings for Walden Water and Sanitation District by Apex Companies, LLC dated July 2026.
- Miscellaneous correspondence.

The Engineering Section is interested in collecting feedback about your experience during the review process. Please take a moment to fill out our survey.

If you have any questions, please contact Colin Armstrong at either (303) 691 - 4097 or colin.armstrong@state.co.us.

Sincerely,

Colin Armstrong
Digitally signed by Colin Armstrong
Date: 2026.10.29 12:39:16 -06'00'

Colin Armstrong
Review Engineer
Engineering Section
Water Quality Control Division
Colorado Department of Public Health and Environment

cc: Ellen Ellson, Walden Water and Sanitation District ORC
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