SANITARY SEWER SYSTEM

**Basic System Description:** There are 29 active subsurface soil absorption systems (drain fields) that serve the Hanford Site. Of these 29 OSS/LOSS systems, 25 of these are permitted through the Washington State Department of Health (WDOH). The remaining 4 systems that are not permitted were constructed before July 1, 1984. Although drain field use is allowed onsite, the WDOH agency will not allow new connections or modifications to these existing systems unless each drain field is updated to current permit standards.

In addition, 9 WDOH-permitted holding tanks and 4 non-permitted holding tanks are being used to meet the need for sanitary sewer systems where project life or other circumstances do not justify a full subsurface soil absorption system. Many portable/temporary restroom and shower trailers are stationed across the Hanford Site in locations not serviced by OSS/LOSS systems or holding tanks.

The 200W Area Lagoon Treatment System is an aerated evaporative lagoon on the north side of the 200W Area. The 200W Area Lagoon is a zero discharge wastewater treatment system adaptable to changing conditions as facilities are decommissioned.

The 300 Area sanitary sewer collection system consists of 6 lift stations and one monitoring station (3906C) which meters effluent flow before the sewage is processed through to the City of Richland wastewater treatment plant.

The 400 Area is served by a subsurface soil absorption system (drain field) constructed in 2013.

Attributes for the overall Sanitary Sewer System are provided in Table 3-12.

**Current Condition FY2017:**

The following criteria are used for assessing the condition of the systems:

- **Excellent** – Systems in excellent condition will typically contain new equipment, installed within the last 3 years. The system will have no significant corrective maintenance history, and no issues identified during recent surveillance activities. The asset has no operation problems, requires only typical preventive maintenance, and shows no signs of deterioration.

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**Table 3-12. Sanitary Sewer System Attributes**

<table>
<thead>
<tr>
<th>Category</th>
<th>Attributes</th>
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</table>
| Operate, Safe & Regulatory Compliant System | - Meets or exceeds *Washington Administrative Code* Standards.  
- Sampling and Compliance Reports.  
- Quarterly Discharge Monitoring Program. |
| Availability, Right-Size & Reduce Active Site Footprint | - Reduced impact footprint.  
- Requirements for lagoon, septic system, drain field, holding tank systems.  
- Capabilities of lagoon, septic system, drain field, holding tank systems.  
- Population shifts and reductions.  
- Planned sewer and building projects.  
- Reduction in required operating systems.  
- System availability.  
- Conditions assessments. |
| Sustainability & Minimize Impact to Environment | - Reductions in resource consumption.  
- Reductions in lifecycle costs.  
- Improved efficiency.  
- Reduced risks of impacts.  
- Projects supporting reduced environmental impacts. |
| Reliability | - Criticality analysis.  
- Risks and mitigations.  
- Implement planned improvements.  
- New systems. |
| Maintainability | - Execute MSA Maintenance program 5 Year Plan Strategies and Section 6.0 of HNF-6612, Hanford Sanitary Sewer System Master Plan. |
- **Good** – Systems in good condition may contain relatively new equipment, within the first 25% of their expected lifecycle. The system may have only minimal corrective maintenance history and only minor issues identified during recent surveillance activities. The system may have minimal operation problems which do not impact the overall functionality of the system, and/or shows minimal signs of deterioration.

- **Fair** – Systems in fair condition may contain moderately aged equipment, between 25% and 50% of their expected life cycle. The system may have a moderate corrective maintenance history, and may have issues identified during recent surveillance activities. The system may have moderate operational problems which impact the overall functionality of the equipment, and/or shows moderate signs of deterioration.

- **Poor** – Systems in poor condition may contain equipment beyond 50% of its expected life cycle. The system may have an extensive corrective maintenance history, and may have significant issues identified during recent surveillance activities. The system may have significant operations problems which impact the overall functionality of the equipment, and/or shows significant signs of deterioration.

- **Failed** – Systems that have failed are not operational and require significant repair or replacement to return the system to an operational state.

- **Condition:**
  - 200W Lagoon: Good.
  - OSS/LOSS systems: Fair.
  - 300 Area: Excellent.

- **Capacity:**
  - 200W Lagoon: Excellent.
  - OSS/LOSS systems: Excellent.
  - 300 Area: Excellent.

- **Reliability:**
  - 200W Lagoon: Good.
  - OSS/LOSS: Fair.
  - 300 Area: Excellent.

- **Population Served**: 5,516 includes all Site areas covered except 400 Area, WTP complex as well as LIGO, US Ecology, BPA and ENW in 600 Area.

- **Areas Served**: Entire Hanford Site, except Energy Northwest (ENW), the Laser Interferometer Gravitational-Wave Observatory (LIGO), US Ecology, the Bonneville Power Administration (BPA).

- **Gaps and Planned Projects**: No gaps identified; refer to Appendix B for planned projects.

The demand driver for sanitary liquid waste systems is the onsite workforce population, which is expected to transition from 5,516 in FY2017 to 5,482 site workers in FY2022 for areas serviced by MSA’s sanitary sewer system. As cleanup progresses, the overall workforce population decreases slightly over the next 5 years, the amount of sanitary liquid waste will decrease slightly, followed by a slight increase for supporting the DOE Hanford Tank Waste Treatment and Immobilization Plant (WTP) operations in 200 E.

No large onsite septic system can be abandoned until all buildings connected to that system have been closed and disconnected from the water and sewer services or consolidated to directly flow to the 200W Lagoon. With the L-853/ L-854 projects in the 200 East Area, several OSS/LOSS systems will be removed to provide a central collection and conveyance system to the existing 200 West Area Lagoon Treatment System. Likewise, holding tanks must be serviced regularly until the existing facilities they support are closed and disconnected from the tanks. Consequently, although the footprint shrinks, the existing drain fields are among the last support utilities to be shut down or removed.
The 200E, 200W, 100, 600 and 400 Areas are served by 29 permitted onsite septic tank soil absorption systems with many systems having operated for nearly 40 years. Some systems are not functioning properly and repairs are being made to return the systems to full operability. The majority of the 200 Area facilities have been tied into the nearest permitted septic systems. A consolidation plan started during FY2015 while site planning for 12 facilities in the vicinity of 4th and 7th along Buffalo in the center of 200E. In general, existing holding tanks will continue to be used within 200E until projects L-853 and L-854 are completed to install 5 miles of pressurized force main pipe along with 10 lift stations. Reductions in greenhouse gas and carbon emissions from reduced trucking trips is an estimated 1,058 gallons a year in diesel fuel savings.

The 300 Area collection system is managed by MSA, and discharges sanitary sewer to the City of Richland sewer collection system.

The 400 Area is currently served by a LOSS constructed in 2014.

A significant milestone at the 6608 Building is biosolids management start-up during June to August, 2017. Securing equipment and supplies, operator orientation and operational policy refinement are among the major tasks to initiate biosolids management procedure at the wastewater lagoon complex. Also, the Washington Dept. of Ecology plant operating permit is being renewed during June, 2017 for another five years ahead.

**End State FY2022:**

Sewer system capacity will be considered excellent and sewer system condition will be considered fair. The projected site-wide peak demand of 43,500 gal/day, for systems serviced by MSA, will be met by the permitted 200W Lagoon Treatment System capacity of 55,000 gal/day and any remaining onsite permitted septic systems which will not end up tying into the consolidated sewer main to the Lagoon. Most of the 200E sewage systems will be connected to the 200W Lagoon Treatment System by the 200E consolidation project described in HNF-6612, Hanford Site Sanitary Sewer Master Plan. Reliability of the overall system will approach 100% with new and recently built facilities in 200E and 200W Areas serving most of the facilities generating sanitary sewer loads. Trucking from remote sites may be one truck/day or less depending on system loading. Planning and cost-benefit evaluation discussion will begin about a possible 200 West consolidation using a phased approach for implementation beyond FY2022 as outlined in the HNF-6612, Hanford Site Sanitary Sewer Master Plan.

- **Condition:**
  - 200W Lagoon: Good.
  - OSS/LOSS systems: Good.
  - 300 Area: Projected to be transitioned outside of Mission Support Contract scope.

- **Capacity:**
  - 200W Lagoon: Fair.
  - OSS/LOSS systems: Excellent.
  - 300 Area: Projected to be transitioned outside of Mission Support Contract scope.

- **Reliability:**
  - 200W Lagoon: Good.
  - OSS/LOSS systems: Good.
  - 300 Area: Projected to be transitioned outside of Mission Support Contract scope.

- **Population Served:** 5,482 includes all Site areas covered except 400 Area, 300 Area, WTP complex as well as LIGO, US Ecology, BPA and ENW in 600 Area.

- **Areas Served:** Entire Hanford Site, except ENW, LIGO, U.S. Ecology, BPA.
Cost Avoidance Proposals: As summarized in Appendix F, the cost savings, innovations, and quality improvements for the sanitary sewer system are described as follows:

- **Remote Area Sewer Strategy – Reduce Trucking and pump outs, Consolidate Demand in 200E.** Isolated sanitary sewer loads at the end of a long run of pipe are good candidates for demolition, consolidating general purpose facilities and eliminating low-level occupancy facilities. The first type of long-term cost avoidance will result from reducing costs to maintain sanitary sewer features for small loads lying at remote distances from the main system trunk sewer line that eventually will serve the 200E core area of the Central Plateau. The second type of cost avoidance is elimination of 1 holding tank and 8 drain fields. MSA hopes to accomplish both objectives in 200E by projects L-853 and L-854 adding 5 miles of pressurized force main conveyance system and 10 lift stations, extending from 200E to the 200W lagoon. Eliminating existing buildings is part of the overall planned demolition process. Discouraging new facilities in 200E site areas without any sanitary sewer service during site evaluation process is part of the strategy. Overall, a reduced sanitary sewer system footprint in 200E results in a net long-term cost benefit, by reducing resources required to pump out existing septic tanks serving drain fields and holding tanks, and haul to lagoon via truck.

- **Remote Small Building Sewer Strategy - Eliminate Sources of Demand.** In conjunction with the sustainability strategy for metering and analyzing general-purpose buildings energy and water performance and making selective upgrades, MSA will start a program to identify and remove small buildings where long runs of sanitary sewer pipes can be removed (pipes from an existing building to a drain field or a tank now being pumped).

- **New Buildings Strategy – Reduce Reliance on Existing Sewer Utilities.** For the overall sustainability strategy following DOE guidance released in February, 2016, new construction proposals are required to consider alternative water systems, rather than assume the existing centralized sanitary sewer system will provide 100% of the new sanitary sewer load for new buildings. Examples of high-performance wastewater systems at federal sites in arid locations includes facilities designed to include storm water capture, storage tanks, gray-water processing and treatment by filtration and use of reduced-flow water fixtures to avoid 100% reliance on centralized sanitary sewer utilities system. This strategy would apply to only a few large new buildings in the 200E area.

**Existing Gaps:** None identified.

**Major Actions/Decisions Needed:** Refer to Appendix E.

**Roadmap:** Refer to Figure 3-13.

Revised September 11, 2017
Figure 3-13. Sanitary Sewer System Roadmap

Sanitary Sewer Roadmap

2017 CURRENT CONDITION

- Population served: 5,516
- 200W evaporative lagoon in operation
  - Capacity: 55,000 gallons/day
- All wastewater received at 200W evaporative lagoon is pumped from holding tanks and heated by truck
  - Approximately 10,000 gallons/day
- Continued operations of existing septic systems
- Drain fields = 20
- Holding tanks = 13

Sanitary Sewer Systems
- Holding Tank - HT
- Large On-site - LOSS
- On-site - OSS
- Phasing Out - HT
- Phasing Out - LOSS
- Inactive Tank
- Existing Lift Station
- Proposed Lift Station
- Existing Sanitary Sewer Pipe
- Proposed Sanitary Sewer Pipe
- 200N Sewer Lagoon & 6866 Biosolid HandlingFac.
- 200E Area Sanitary Sewer Consolidation Projects
- Possible 200N/Phased Sanitary Sewer Consolidation Project

Project Descriptions

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<th>Project Description</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
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* Project Supports LAWPS

END STATES 2022

- Population served: 5,492
- Target number of building connections: 300
- Demand in FY2022: 43,500 gal/day met by ground and central system
- 200E sewer consolidation includes:
  - Removal of 9 existing drain fields
  - Removal of 1 holding tank
  - Add 10 lift stations with 5 miles of force main pipe to 200N lagoon facility for treatment
- Potential 300 Area system transfer to PNSO by FY2018 or earlier according to RLF-PNSO agreement
- Continue to study 200W consolidation as a phased program of projects due to aging systems
- Excludes WTP/ROF Complex loads
- Completed potable water at gap at 222-S

Major Actions/Decisions

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<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
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[Diagram of Sanitary Sewer Roadmap]