



U.S. DEPARTMENT OF  
**ENERGY**



# Savannah River Site

## Common Infrastructure and Utilities

Savannah River Site

**David Bender**

DOE-SR Division Director

Infrastructure and Area Completion Division

*September 20, 2021*

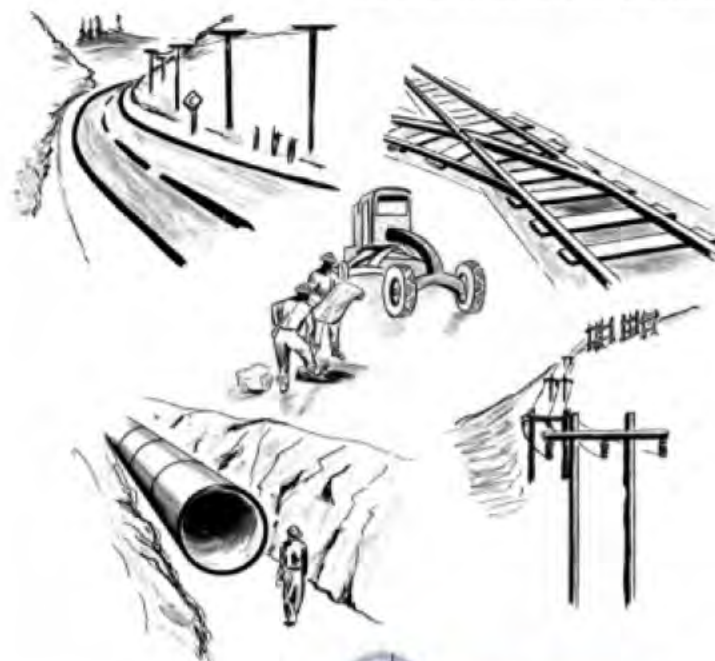
## Savannah River Site (SRS)

- SRS Common Infrastructure and Utilities are Essential
- EM Integrated Life Cycle Estimate for Clean up Projection is currently to 2065
  - Common Facilities
    - *Transportation - Roads, Bridges, Rail Roads*
    - *Facilities – Administrative, Shops, Warehouses, IT ....*
  - Utilities
    - *Electricity*
    - *Steam*
    - *Water – Domestic, Service/Process, Fire, Sanitary*
    - *River Water*
- SRS Common Infrastructure and Utilities require consistent management attention to remain viable for future

### **You Can't Run a Reactor If You Can't Get To It:**

A Study of Savannah River Site's Infrastructure

Aiken, Barnwell and Allendale Counties, South Carolina





# Common Infrastructure and Utilities

## SRS Mission Facilities



Savannah River National Lab



Pu Processing Facility (NNSA)



H Canyon (Nuclear Materials)



K-Reactor (Pu) (Nuclear Materials)



DWPF  
(Waste Disposition)



Saltstone  
(Waste Disposition)



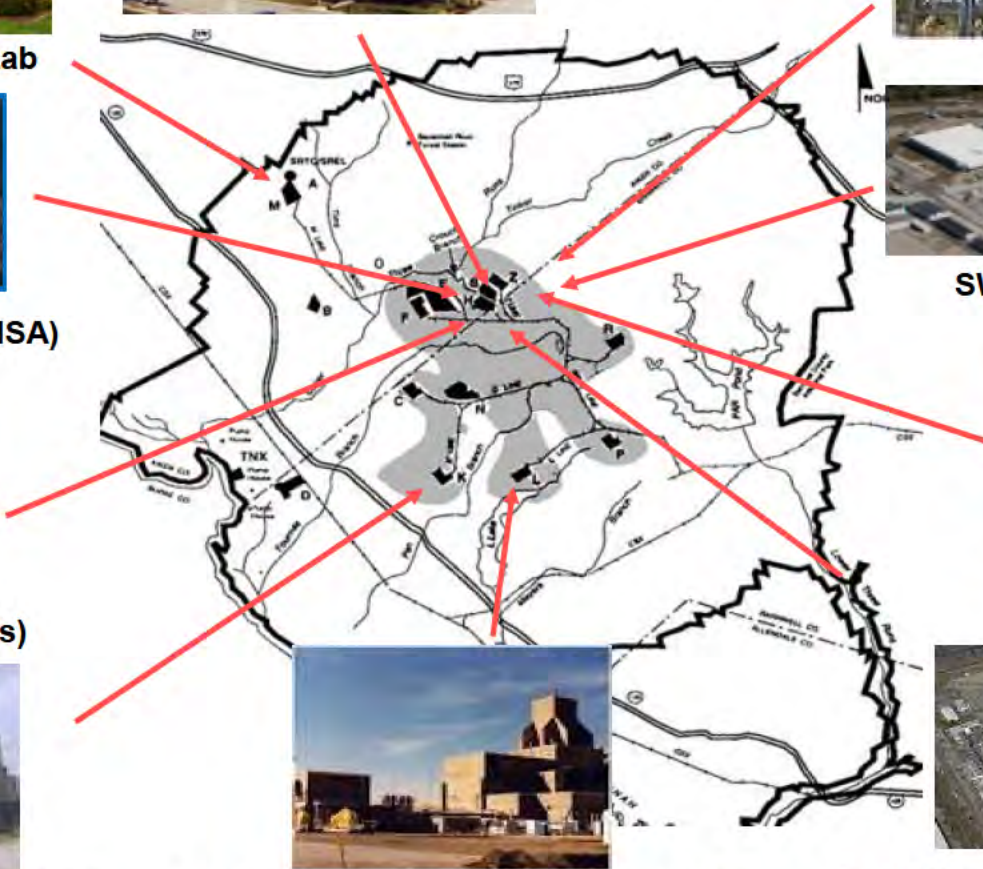
SWPF (Waste Disposition)



Tritium (NNSA)



Tank Farms F & H (Waste Disposition)



L-Reactor (SNF) (Nuclear Materials)



# Common Infrastructure and Utilities

## SRS Map

### Electric Power

(64 Miles High Voltage Lines)  
(9 Large Substations)  
(180 Miles Distribution Lines)



### Facilities

(44 - Admin, Shops, Emer, Security)



### Roads

(119 Miles Paved)



### Domestic Water

(2M Gals/day)



### Fire Water

(1500 Hydrants)

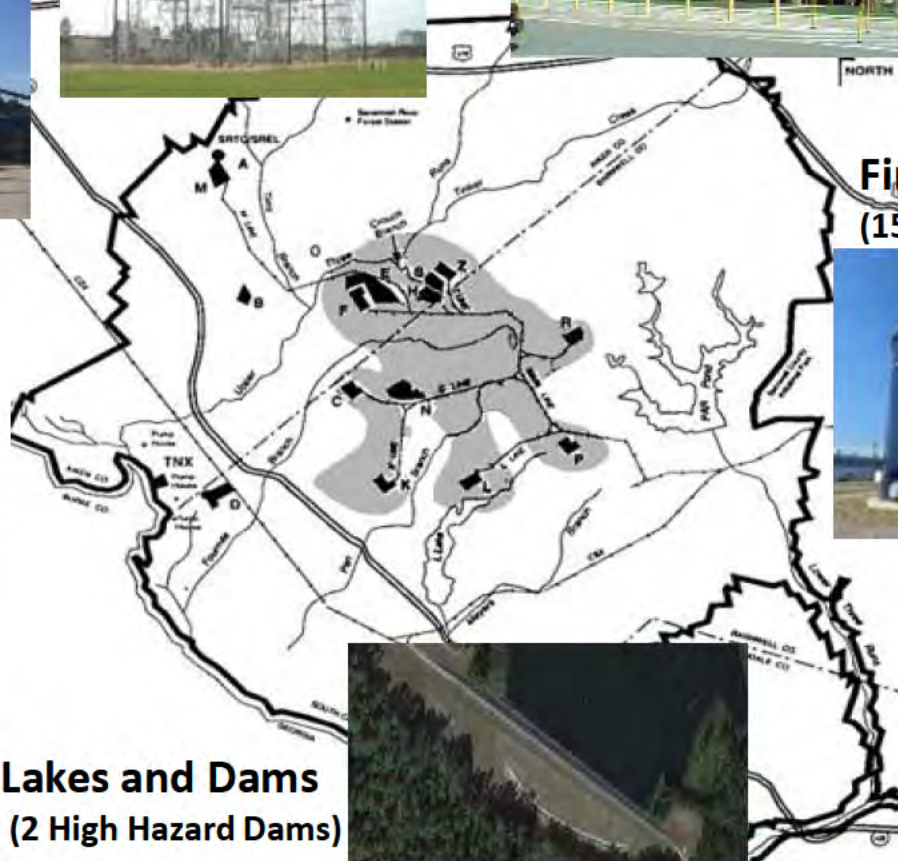


### Rail Roads (33 Miles Track)



### Lakes and Dams

(2 High Hazard Dams)



### Steam Energy

(5 Biomass Plants)



### River Water (7500 GPM)



### Sanitary Waste Water

(Central Sanitary Plant)





## SRS Infrastructure Types

### Mission Specific (Program) Infrastructure:

All PBSs (Nuclear Materials, Liquid Waste, etc...)

### Common Infrastructure: Supports more than one Site Tenant

#### Basic Infrastructure:

Maintenance of Site common infrastructure (examples: common use facilities, administrative facilities, roads, parking areas, and bridges .... )

#### Utilities:

Utility commodities (examples: electrical distribution, domestic water, steam, sanitary waste ....)

#### Service Centers:

Enables a critical service (examples: IT services, radios, telephones ....)

K-Reactor



Badge Office



Biomass Plant (Steam)



Calibration Shop





## Common Infrastructure and Utilities Funding

SRS  
MISSION  
WORK  
\$\$

### Program Baseline Summary – PBS (Control Point Level)

The budgeting and funding mechanism to resource specific DOE-SRS programs that are contained within the DOE-Environmental Management Work Breakdown Structure (PBS 14 – Liquid Waste Disposition, PBS 30 – Soil and Water Remediation, ....)

SRS  
MISSION  
WORK  
\$\$

#### Utilities and Services



**Utilities (Pool)**  
(commodity and infrastructure)

**Services (Pool)**  
(service and infrastructure)



**Common Infrastructure  
(LandLord Services)**

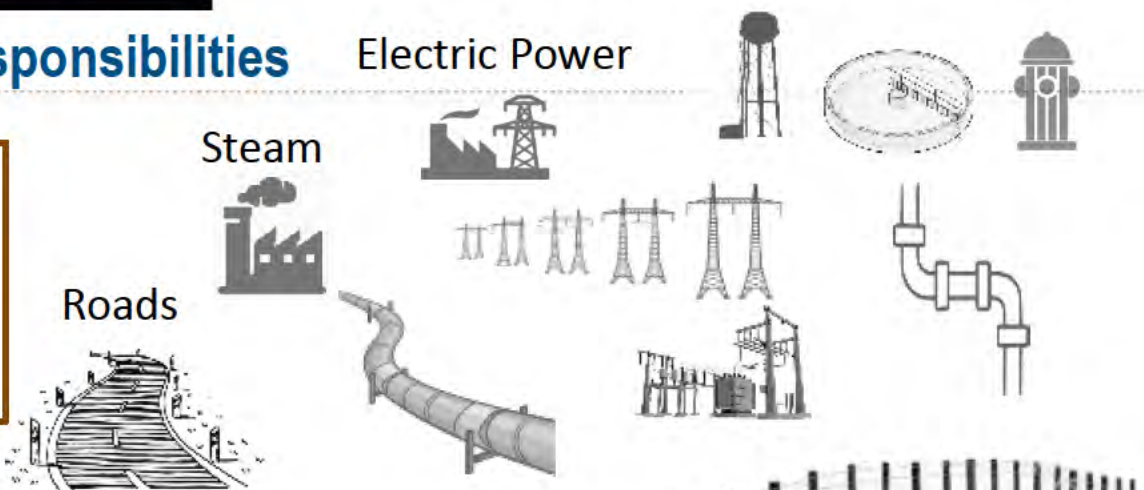


INDIRECTS / OVERHEADS

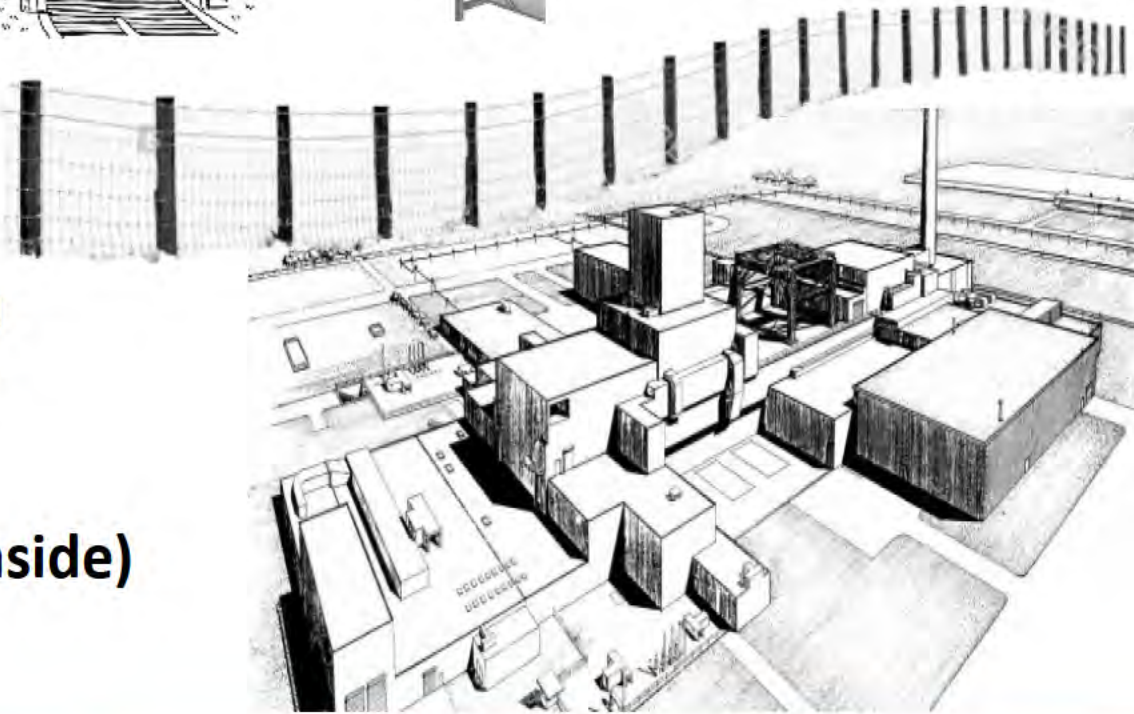
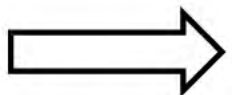
INDIRECTS / OVERHEADS

## “Outside / Inside the Fence” Responsibilities

**Indirect Funded (Outside)**  
-LandLord Services  
-Power (Utility) Pools



**The Fence\***



\*Represents the agreed physical boundaries between Indirect and Mission Program responsibilities

**Mission Program Funded (Inside)**



## Provide Infrastructure and Utilities to Mission Programs

### Measure, Track/Trend, Improve, Report

- Daily Systems Reports & Site Heads-Ups

- Monthly Systems Status Review

Report Date: 04/27/2011

SAVANNAH RIVER SITE

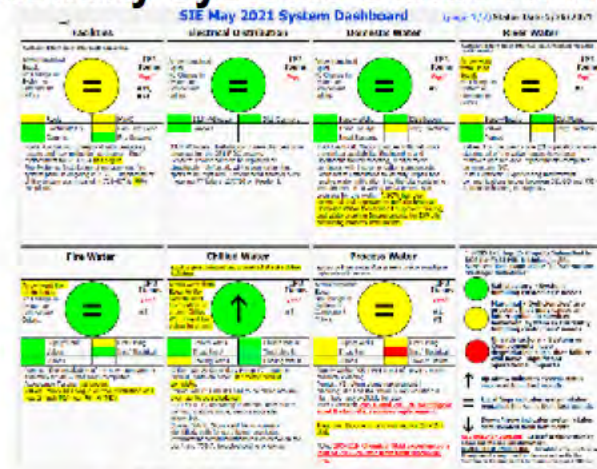
INFRASTRUCTURE

Area: 3.0 - Water

Area	Category	System	Status	Comments
3.0	Water	3.0010	Operational	
3.0	Water	3.0020	Operational	
3.0	Water	3.0030	Operational	
3.0	Water	3.0040	Operational	
3.0	Water	3.0050	Operational	
3.0	Water	3.0060	Operational	
3.0	Water	3.0070	Operational	
3.0	Water	3.0080	Operational	
3.0	Water	3.0090	Operational	
3.0	Water	3.0100	Operational	
3.0	Water	3.0110	Operational	
3.0	Water	3.0120	Operational	
3.0	Water	3.0130	Operational	
3.0	Water	3.0140	Operational	
3.0	Water	3.0150	Operational	
3.0	Water	3.0160	Operational	
3.0	Water	3.0170	Operational	
3.0	Water	3.0180	Operational	
3.0	Water	3.0190	Operational	
3.0	Water	3.0200	Operational	
3.0	Water	3.0210	Operational	
3.0	Water	3.0220	Operational	
3.0	Water	3.0230	Operational	
3.0	Water	3.0240	Operational	
3.0	Water	3.0250	Operational	
3.0	Water	3.0260	Operational	
3.0	Water	3.0270	Operational	
3.0	Water	3.0280	Operational	
3.0	Water	3.0290	Operational	
3.0	Water	3.0300	Operational	
3.0	Water	3.0310	Operational	
3.0	Water	3.0320	Operational	
3.0	Water	3.0330	Operational	
3.0	Water	3.0340	Operational	
3.0	Water	3.0350	Operational	
3.0	Water	3.0360	Operational	
3.0	Water	3.0370	Operational	
3.0	Water	3.0380	Operational	
3.0	Water	3.0390	Operational	
3.0	Water	3.0400	Operational	
3.0	Water	3.0410	Operational	
3.0	Water	3.0420	Operational	
3.0	Water	3.0430	Operational	
3.0	Water	3.0440	Operational	
3.0	Water	3.0450	Operational	
3.0	Water	3.0460	Operational	
3.0	Water	3.0470	Operational	
3.0	Water	3.0480	Operational	
3.0	Water	3.0490	Operational	
3.0	Water	3.0500	Operational	

Table 1: Environmental Compliance & Area Completion Status

Area	Category	System	Status	Comments
3.0	Water	3.0010	Operational	
3.0	Water	3.0020	Operational	
3.0	Water	3.0030	Operational	
3.0	Water	3.0040	Operational	
3.0	Water	3.0050	Operational	
3.0	Water	3.0060	Operational	
3.0	Water	3.0070	Operational	
3.0	Water	3.0080	Operational	
3.0	Water	3.0090	Operational	
3.0	Water	3.0100	Operational	
3.0	Water	3.0110	Operational	
3.0	Water	3.0120	Operational	
3.0	Water	3.0130	Operational	
3.0	Water	3.0140	Operational	
3.0	Water	3.0150	Operational	
3.0	Water	3.0160	Operational	
3.0	Water	3.0170	Operational	
3.0	Water	3.0180	Operational	
3.0	Water	3.0190	Operational	
3.0	Water	3.0200	Operational	
3.0	Water	3.0210	Operational	
3.0	Water	3.0220	Operational	
3.0	Water	3.0230	Operational	
3.0	Water	3.0240	Operational	
3.0	Water	3.0250	Operational	
3.0	Water	3.0260	Operational	
3.0	Water	3.0270	Operational	
3.0	Water	3.0280	Operational	
3.0	Water	3.0290	Operational	
3.0	Water	3.0300	Operational	
3.0	Water	3.0310	Operational	
3.0	Water	3.0320	Operational	
3.0	Water	3.0330	Operational	
3.0	Water	3.0340	Operational	
3.0	Water	3.0350	Operational	
3.0	Water	3.0360	Operational	
3.0	Water	3.0370	Operational	
3.0	Water	3.0380	Operational	
3.0	Water	3.0390	Operational	
3.0	Water	3.0400	Operational	
3.0	Water	3.0410	Operational	
3.0	Water	3.0420	Operational	
3.0	Water	3.0430	Operational	
3.0	Water	3.0440	Operational	
3.0	Water	3.0450	Operational	
3.0	Water	3.0460	Operational	
3.0	Water	3.0470	Operational	
3.0	Water	3.0480	Operational	
3.0	Water	3.0490	Operational	
3.0	Water	3.0500	Operational	



- Weekly FY Infrastructure Improvement Execution Plan Schedule Status Reviews

Site Services - Utility Pool  
FY 2011 Schedule Performance Scope Review  
April 2011

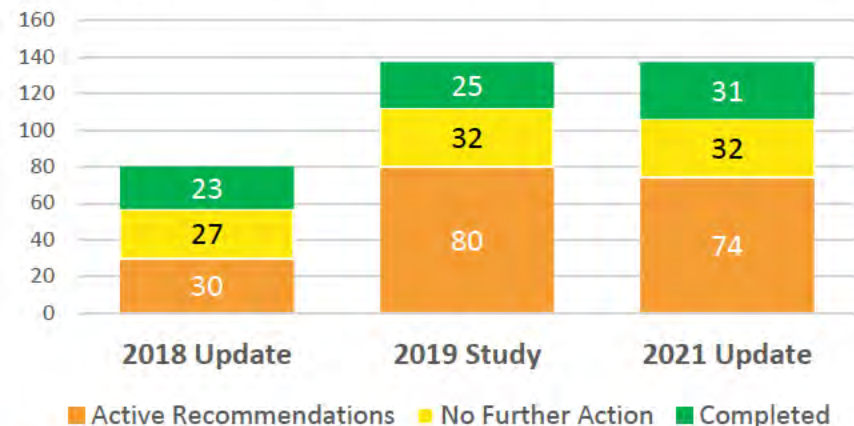
Project	Work Scope #	MAR	APR	YTD	Remaining	Execution Estimate	% Scope Complete
DOMESTIC WATER	1. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 301-310 & 311	\$ 44,000	\$ 1,000	\$ 45,000	\$ 0	\$ 45,000	100%
	2. Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	3. Develop Procurement of Spare Parts for Unit 301-310	\$ 386,000	\$ 2,200	\$ 388,200	\$ 0	\$ 388,200	100%
<b>Total Domestic Water</b>		<b>\$ 430,000</b>	<b>\$ 3,200</b>	<b>\$ 433,200</b>	<b>\$ 0</b>	<b>\$ 433,200</b>	<b>100%</b>
ELECTRICITY	4. Develop Tender Review Process and Approval (1 Decision)	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	5. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 20,000	\$ 20,000	\$ 40,000	\$ 0	\$ 40,000	100%
	6. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	7. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	8. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	9. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	10. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	11. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	12. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	13. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	14. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	15. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	16. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	17. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
<b>Total Electricity</b>		<b>\$ 20,000</b>	<b>\$ 20,000</b>	<b>\$ 40,000</b>	<b>\$ 0</b>	<b>\$ 40,000</b>	<b>100%</b>
FAC SUPPLEMENTAL WATER	18. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	19. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	20. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	21. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
<b>Total Fac Supplemental Water</b>		<b>\$ 0</b>	<b>\$ 0</b>	<b>\$ 0</b>	<b>\$ 0</b>	<b>\$ 0</b>	<b>0%</b>
PROCESS WATER	22. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
	23. Develop Procurement and Admin. Call Numbers to Replace Backflow for Units 312-315	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	0%
<b>Total Process Water</b>		<b>\$ 0</b>	<b>\$ 0</b>	<b>\$ 0</b>	<b>\$ 0</b>	<b>\$ 0</b>	<b>0%</b>



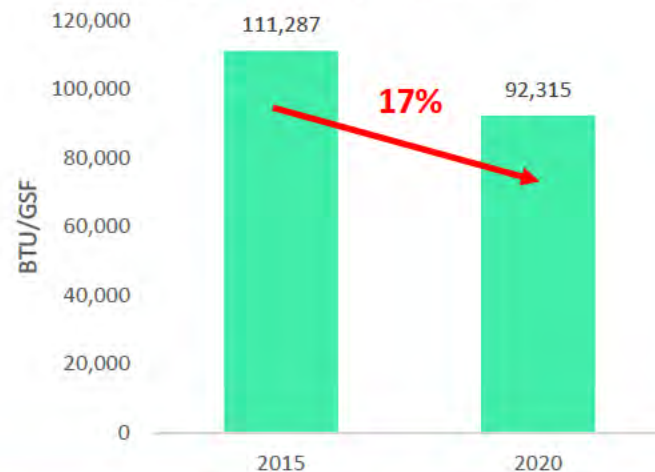
## Prepare Site for Future

- **“Right Sizing” – Expand/Reduce/Modernize to most efficiently meet current and future missions**
  - Infrastructure Alignment Studies (every 5 years)
  - 137 Recommendations: 31 Completed 74 In-process
- **Sustainability**
  - Maintenance, Replacement and Repair: Modernize with most Energy Efficient tools and equipment
  - Energy Intensity Reduction (since 2015)
    - “Cool” Roofs” – 37 (No Major Roof Replacements in 2020!)
    - HVAC upgrades – 82 replacements (Increase SEER\* Value)
    - LEDs – Over 2000 old fixtures replaced
  - Utility Scale (10 MW) Solar Study FY2019
    - Current Purchased Power Rates Competitive
    - Majority of Savings through Demand Peak Reductions
    - Not affordable w/o Subsidy
    - Evaluate FY22

### Alignment Studies - Recommendation Status



### Energy Intensity - Reduction



\*SEER – Seasonal Energy Efficiency Ratio



# Common Infrastructure and Utilities

## Prepare Site for Future through “Road to Green” Vision

### 12 Common Infrastructure / Utility Systems

### Current State and Plan to become and stay GREEN\*

PECMEC and Transportation

Domestic Water

Steam Gen and Dist

Electrical Dist

Sanitary Waste

Fire Water

Facilities

Chilled Water

River Water

Process/Service Water

Dams, Outfalls, Basins, Lakes

Roads, Bridges, Railroads

	Jan-13	Jan-14	Jan-15	Jan-16	Jan-17	Jan-18	Jan-19	Jan-20	Jan-21	Jan-22	Jan-23	Jan-24	Jan-25	Jan-26	Jan-27
PECMEC & Transportation	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Domestic Water	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Steam Gen. & Distribution	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Electrical Distribution	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Sanitary Wastewater	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Fire Water	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Chilled Water	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green
SS Facilities & Support	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green	Green
River Water	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Process / Service water	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Outfalls, Dams, Basins, Lakes	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Roads, Bridges, & Railroads	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

Historical Infrastructure System Status You Are Here Planned Future System Status

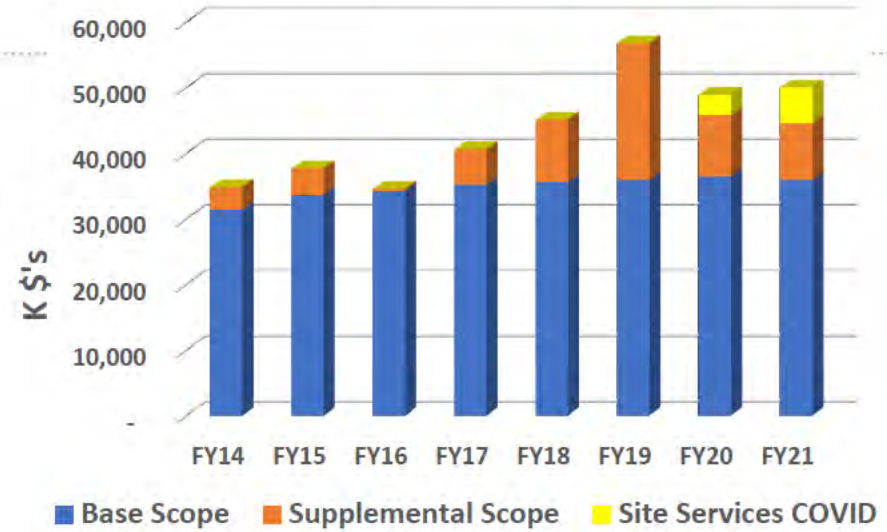
\*Fulfilling Current Mission Needs “Today” with only minor deficiencies



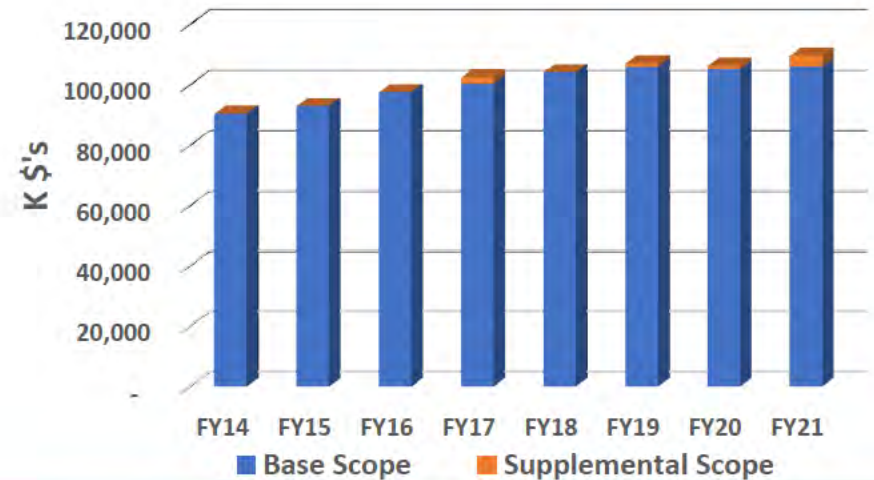
## Resourcing

- SRS Common Infrastructure Operations, Maintenance, and Minor Improvements funded through Indirect Pools

### FY14-FY21 Land Lord Services Common Infrastructure Budget



### FY14-FY21 Utility Pool Budget

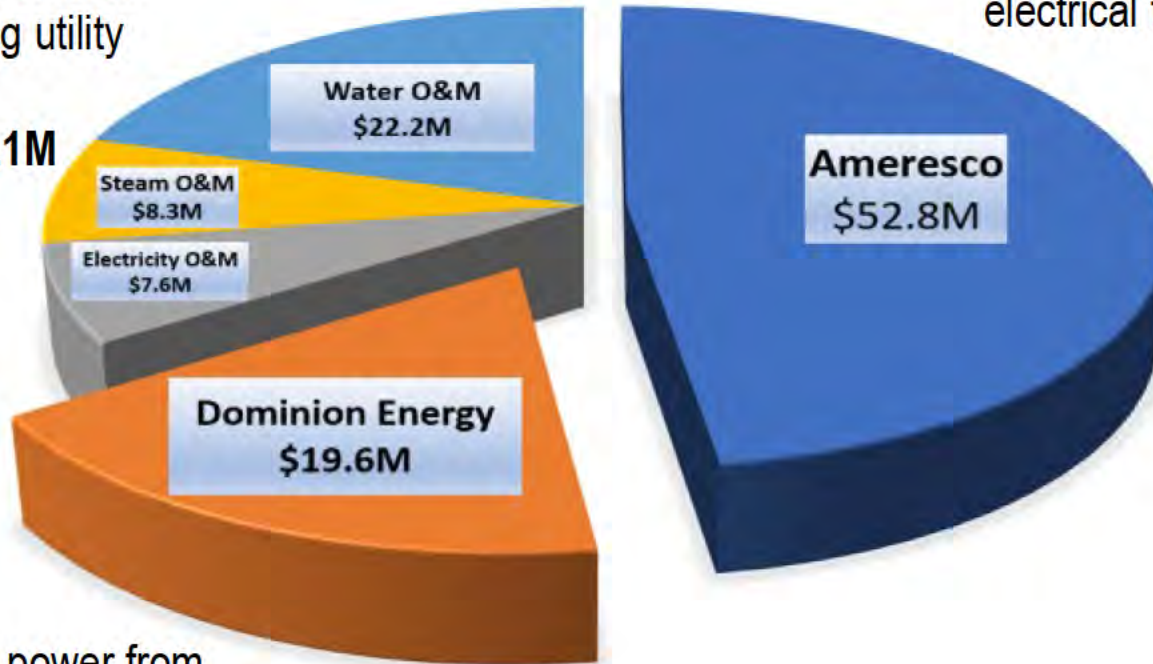


## Utility Pool Budget – Energy Costs are \$73M (~66% of Total Utility Budget)

The Total Utility Pool budget for FY21 is \$110.5 M

Operations and Maintenance  
Costs for maintaining utility  
systems

**Total O&M \$38.1M**



Ameresco ESPC for process  
steam generation and  
electrical turbine operations

Purchased power from  
Dominion Energy South  
Carolina



## Planning for Infrastructure Improvements

### The 5-Year Common Infrastructure Improvement Plan

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

SRNS2020LS-1.03  
RMS Track #10000

January 2021

FY22 - FY26 Site Services' Common Infrastructure 5-Year Plan, Revision 0

Prepared By: **d9068** Digitally signed by d9068 Date: 2021.01.27 07:04:24 -0500  
Taralet T. White, Senior Program Planner, SS Date

Reviewed By: **SANTORO EMERIL BERG (Affiliate)** Digitally signed by EMERIL BERG Date: 2021.01.27 08:46:30 Date  
Santoro Emeril, Sr. Infrastructure Chief Engineer, SS Date

Reviewed By: **DONALD BARFIELD (Affiliate)** Digitally signed by DONALD BARFIELD Date: 2021.01.28 10:11:41 -0500 Date  
Donald Barfield, Director, Site Maint. & Facility Support, SS Date

Reviewed By: **BANDY KEFNAN (Affiliate)** Digitally signed by BANDY KEFNAN Date: 2021.01.28 10:11:41 -0500 Date  
Bandy Kefnan, Director, Site Maintenance, SS Date

Reviewed By: **JONATHAN COLE (Affiliate)** Digitally signed by JONATHAN COLE Date: 2021.01.28 10:11:41 -0500 Date  
Jonathan Cole, Acting Strategic Planning Mgr., SS Date

Reviewed By: **MARGUERITE ELMGRIESEN (Affiliate)** Digitally signed by MARGUERITE ELMGRIESEN Date: 2021.01.28 10:11:41 -0500 Date  
Marguerite Elmgriesen, Director, Business Support, SS Date

Approved By: **CLARENCE REYNOLDS (Affiliate)** Digitally signed by CLARENCE REYNOLDS Date: 2021.01.28 10:11:41 -0500 Date  
Clarence Reynolds, Director, Site Services, SS Date

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

Update each January

### The Fiscal Year Common Infrastructure Improvement Plan (upcoming FY)

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

SRNS2020LS-1.03  
RMS Track #10000

September 2020

FY21 Site Services' Common Infrastructure Improvement Plan (SRNS2020LS-1.03) Revision 0

Prepared By: **JONATHAN COLE (Affiliate)** Digitally signed by JONATHAN COLE Date: 2020.09.15 10:11:41 -0500 Date  
Jonathan Cole, Strategic Planning Mgr., SS Date

Reviewed By: **EIRENE FERGUSON (Affiliate)** Digitally signed by EIRENE FERGUSON Date: 2020.09.15 10:11:41 -0500 Date  
Eirene Ferguson, Strategic Planning Mgr., SS Date

Reviewed By: **MARGUERITE ELMGRIESEN (Affiliate)** Digitally signed by MARGUERITE ELMGRIESEN Date: 2020.09.15 10:11:41 -0500 Date  
Marguerite Elmgriesen, Director, Business Support, SS Date

Reviewed By: **JON GUY (Affiliate)** Digitally signed by JON GUY Date: 2020.09.15 10:11:41 -0500 Date  
Jon Guy, Director, Site Maintenance, SS Date

Reviewed By: **DONALD BARFIELD (Affiliate)** Digitally signed by DONALD BARFIELD Date: 2020.09.15 10:11:41 -0500 Date  
Donald Barfield, Director, Site Maint. & Facility Support, SS Date

Reviewed By: **WAYNE GLEASON (Affiliate)** Digitally signed by WAYNE GLEASON Date: 2020.09.15 10:11:41 -0500 Date  
Wayne Gleason, Director, Site Infrastructure, SS Date

Approved By: **CLARENCE REYNOLDS (Affiliate)** Digitally signed by CLARENCE REYNOLDS Date: 2020.09.15 10:11:41 -0500 Date  
Clarence Reynolds, Director, Site Services, SS Date

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

Complete September before upcoming FY

### The Fiscal Year Infrastructure Improvement Plan Execution Output (current FY)

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

SRNS2020LS-1.01

September 2021

FY20 Site Services' Common Infrastructure Improvement Plan Execution Output (SRNS2020LS-1.01)

Prepared By: **JONATHAN COLE (Affiliate)** Digitally signed by JONATHAN COLE Date: 2021.09.15 10:11:41 -0500 Date  
Jonathan Cole, Strategic Planning Mgr., SS Date

Reviewed By: **EIRENE FERGUSON (Affiliate)** Digitally signed by EIRENE FERGUSON Date: 2021.09.15 10:11:41 -0500 Date  
Eirene Ferguson, Strategic Planning Mgr., SS Date

Reviewed By: **DONALD TURNO (Affiliate)** Digitally signed by DONALD TURNO Date: 2021.09.15 10:11:41 -0500 Date  
Marguerite Elmgriesen, Director, Business Support, SS Date

Reviewed By: **DONALD BARFIELD (Affiliate)** Digitally signed by DONALD BARFIELD Date: 2021.09.15 10:11:41 -0500 Date  
Donald Barfield, Director, Site Maint. & Facility Support, SS Date

Reviewed By: **WAYNE GLEASON (Affiliate)** Digitally signed by WAYNE GLEASON Date: 2021.09.15 10:11:41 -0500 Date  
Wayne Gleason, Director, Site Infrastructure, SS Date

Approved By: **CLARENCE REYNOLDS (Affiliate)** Digitally signed by CLARENCE REYNOLDS Date: 2021.09.15 10:11:41 -0500 Date  
Clarence Reynolds, Director, Site Services, SS Date

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

Complete September of current FY

**SRS COMMON INFRASTRUCTURE IMPROVEMENTS ANNUAL PLANNING CYCLE**



# Common Infrastructure and Utilities

## Asset Condition - Facility Information Management System (FIMS)

- Critical systems maintained and operated to Green/Yellow Dashboard status (Current)
- Consolidated Facility Condition Index scores are low to due to age and Deferred Maintenance (Future Risks)

Age Range	Percentage
>51 Years	25%
31 - 50 Years	36%
15 - 30 Years	31%
<15 Years.	8%

Mission Dependency Index	Asset	# of Assets	Bldg Cond. Index or Lab Ops Board Avg	Haz Cat	Replacement Plant Value (RPV)	Quantity	Age	Deferred Maint./Repair Needs (DM/RN)
Mission Dependent	Domestic Water Systems (901000)	62	48	N/A	\$ 556,485,572	418,996 Ft	Ave. 41 5 - 69 yrs	\$291,487,444
Mission Critical	Fire Water System (902000)	34	10	N/A	\$53,963,371	312,427 Ft	Ave. 27 2 - 68 yrs	\$244,817,000
Mission Critical - Not Mission Dependent	Sanitary Waste Water System (903000)	147	10	N/A	\$113,841,398	297,341 Ft	Ave. 32 6 - 69 yrs	\$131,332,000
Mission Critical	Process/Service Water System (904000)	54	28	N/A	\$132,276,131	44,646 Ft	Ave. 42 7 - 68 yrs	\$95,427,000
Mission Critical	Steam Generation/Distribution System (684000/802000)	13	95	N/A	\$ 281,335,653	68,698 Sq. Ft	Ave. 10 (Plant) 26 - 68 yrs (Distri.)	\$14,139,242
Mission Critical	Riverwater Pumphouse (681003G)	1	10	N/A	\$6,086,393	8,305 Sq. Ft	68 yrs	\$7,145,476
Mission Critical	Electrical Distribution System (503000)	292	68	N/A	\$252,298,736	N/A	Ave. 34 2 - 70 yrs	\$87,890,812
Mission Critical - Mission Dependent	Common Infrastructure Facility (703044)	249	76	N/A	\$549,009,234	2,439,296 Sq. Ft	Ave. 34 5 - 69 yrs	\$126,214,161
Mission Dependent Not Critical	Site Paved Roads (603000)	N/A	71	N/A	\$ 421,797,481	289 Miles	Ave. 53 11 - 69 yrs	\$111,083,600





## Notable Infrastructure Functionality Issues – Electric Power

- **Missions Supported: All SRS “Lettered” Areas**
- **Delivery:**
  - M&O Contractor (SRNS)
    - *Distribution (13.8KV to 480V)*
    - *Local Grid Management and Maintenance*
  - Dominion Energy SC Contract and Lease
    - *Power and Transmission Maintenance (115KV/13.8KV)*
      - Contract: \$325M, 10 years (Expires 2025)
    - *Transmission System Lease: 40 years (Expires 2036)*
- **Risks and Challenges:**
  - Aged Substations: Transformers and Switchgear (C, F, H, K, L)
  - Obsolete Control and Monitoring System (SCADA)
- **Solutions**
  - Program Partnering (NNSA/DOE-SR K & L Area Switchgear)
  - Power Pool Rate Increase



151-1R, September 23, 1952, SRS Negative 1-560



K-Area 151-1K Substation Transformer Today

## Notable Infrastructure Functionality Issues – Water

- **Missions Supported: All SRS “Lettered” Areas**
  - Domestic Water
  - Sanitary Waste Water
  - Fire Water
  - Service/Process Water
- **Delivery: M&O Contractor (SRNS)**
  - Manage, Operate, and Maintain
- **Risks and Challenges:**
  - Aged / Corroded Distribution Pipe (Fire, Service)
  - Aged Packaged Sanitary Waste Systems (K and L Areas)
  - Failing Electric Power Switch Gear (H-Area Process Water)
- **Solutions**
  - Power Pool Rate Increase



*782-A Reservoir Construction, August 28, 1952.*



*Galvanic Corrosion in 70 Year old Service Water Pipe*



## Notable Infrastructure Functionality Issues – Facilities (Common)

- **Missions Supported:**
  - Administrative
  - Training
  - Shops
  - Maintenance
  - Warehouses
  - Medical
- **Delivery: M&O Contractor (SRNS)**
- **Risks and Challenges**
  - Roofs
  - HVAC
  - Habitability
  - Fire Systems
  - Age
  - Interiors/Exteriors
- **Solutions**
  - Increase LandLord Services (Indirect) Rates



*Construction of Railroad Shops (618-G), October 23, 1951, SRS Negative 6-163*



*2014 Roof Leak "Diaper" with hose and bucket. We have a come a long way!*

## Notable Infrastructure Functionality Issues – River Water

- **Missions Supported:**
  - Steam Energy for Canyon, Tank Farms, Tritium, DWPF (H, F, and S Areas)
    - *Boiler Feed Water for the BioCogeneration Facility*
  - L-Area Fire Water
  - L & K Area Sanitary Treatment
  - Cover Rad Sediments in L Lake and Par Pond
- **Delivery: M&O Contractor (SRNS)**
- **Risks and Challenges**
  - 70 Year old Electrical Power System
  - 70 Year old River Water Intakes (traveling screens)
- **Solutions**
  - Increase LandLord Services (Indirect) Rates



Laying Water Lines, April 3, 1952, SRS Negative DPESF-712-08



River Water Pump House 681-3G



## Notable Infrastructure Functionality Issues – Roads

- **Missions Supported:**
  - All Site Missions and Areas
- **Delivery: M&O Contractor (SRNS)**
- **Risks and Challenges**
  - Deteriorating Pavement (Asphalt)
  - Obsolete Guardrail material
  - Greatest LandLord Services Funding Challenge
- **Solutions**
  - Increase LandLord Services (Indirect) Rates



*View of Cloverleaf Intersection, February 11, 1952, SRS Negative M621*



*Road C Repaving*

## Change Control Example - Tropical Storm Sally

- FY21 budget was set for indirect budget scopes.
- An emergent need to remediate buildings impacted by Tropical Storm Sally.
- A Change Control Package was submitted to the DOE Indirect Oversight Team.
- The DOE Indirect Oversight Team approved the reduction of Road E refurbishment scope to redirect the indirect funding to accommodate the emergent need.



Interior Damage in 766-H Training Building



Water on Roof of 766-H Training Building



## Site Service's Habitability Evaluation Report

### HABITABILITY REPORT

SORTED BY TOTAL BUILDING SCORE

FACILITY	AREA	BUILT	SQ FT	Contractor	PROPERTY NAME	ROOF	HVAC	INT	EXT	TOTAL	
1	<a href="#">222-B</a>	A	1953	12,990	SRNS	ELECTRICAL REPAIR SHOP	1.41	0.96	0.93	0.23	3.52
2	<a href="#">204-L</a>	L	1954	18,721	SRNS	ADMINISTRATION BUILDING	1.41	0.84	0.85	0.33	3.42
3	<a href="#">204-715</a>	S	1983	21,113	SRR	TC-51 ADMINISTRATION BUILDING	1.41	0.96	0.80	0.23	3.19
4	<a href="#">205-N</a>	N	1953	12,167	SRNS	ADMINISTRATION BUILDING	1.54	0.43	0.95	0.19	3.10
5	<a href="#">204-H</a>	H	1955	18,494	SRNS	ADMINISTRATION BUILDING	1.47	0.78	0.53	0.26	3.04
6	<a href="#">237-B</a>	A	1977	43,804	SREL	ENVIRONMENTAL RESEARCH LAB	1.07	0.60	0.63	0.10	3.00
7	<a href="#">204-S0E</a>	E	1991	1,740	SRNS	CONFERENCE ROOM TRAILER	1.27	0.96	0.58	0.16	2.97
8	<a href="#">205-H</a>	H	1985	24,372	SRNS	TRAINING BUILDING	1.47	0.60	0.70	0.13	2.91
9	<a href="#">206-N</a>	N	1953	7,339	SRNS	ADMINISTRATION BUILDING	1.54	0.43	0.70	0.24	2.90
10	<a href="#">207-F</a>	F	1991	16,142	SRNS	ADMINISTRATION BUILDING	1.47	0.37	0.65	0.23	2.72

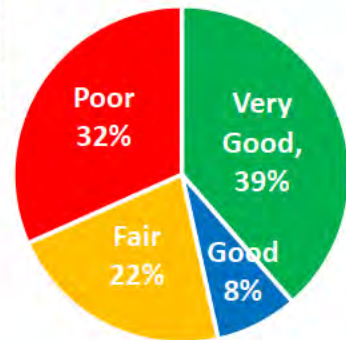
### Facility Information Management System (FIMS) Data

#### Age of Operating Common Infrastructure & Utilities Assets

>51 Years	25%
31 - 50 Years	36%
15 - 30 Years	31%
<15 Years.	8%

- Facility
- Location - Area
- Year Built
- Square footage
- Contractor
- Structure Name
- Ratings for Roof, HVAC, Interior and Exterior

### Operating Assets





## Site Service's Habitability Evaluation Report - Habitability Criteria

**Roofing Criteria-** age, repair costs over past 5 years, amount of roof top equipment etc.

**HVAC Criteria-** units past a service life of 15 years, average number of personnel impacted by unit outage

**Interior Criteria-** floors, walls/ceilings, restrooms, fire systems and industrial hygiene concerns

**Exterior Criteria-** windows, siding/foundation, doors, steps/walkways and parking

### HABITABILITY ROLLUP REPORT

SORTED BY TOTAL SCORE

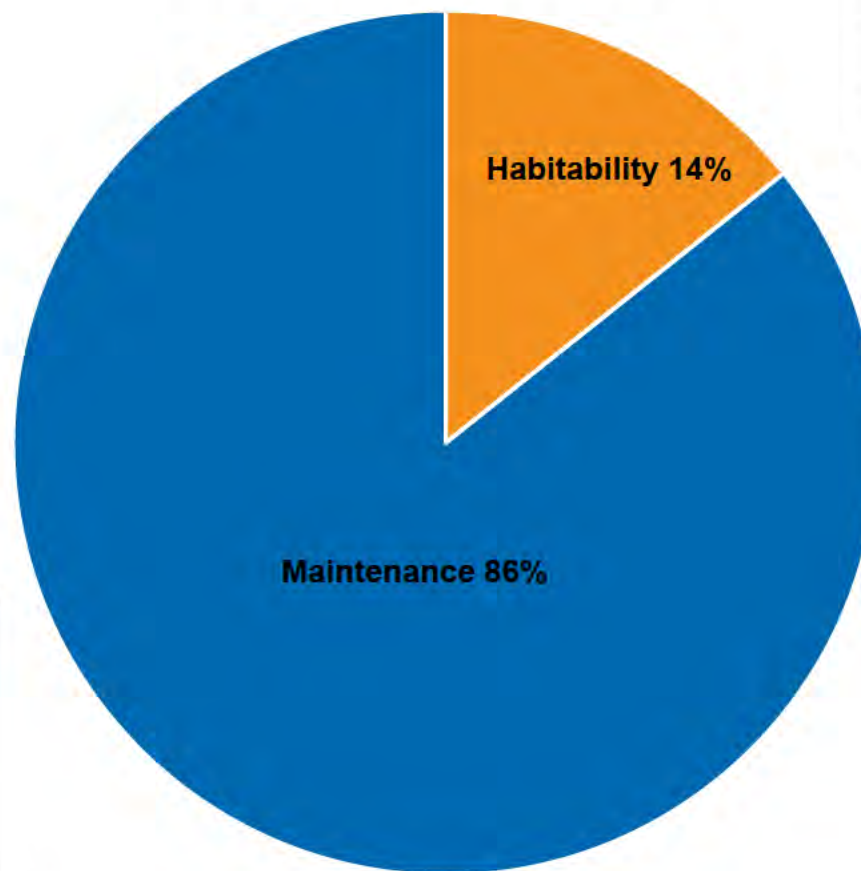
#### PILOT EXPANSION FY20

FACILITY	AREA	BUILT	SQ.FT	Contractor	PROPERTY NAME	ROOF	HVAC	INT	EXT	TOTAL	
1	<a href="#">704-L</a>	L	1954	18,721	SRNS	ADMINISTRATION BUILDING	1.41	0.84	0.65	0.33	3.42
2	<a href="#">704-715</a>	S	1983	21,113	SRR	TC-SI ADMINISTRATION BUILDING	1.41	0.96	0.60	0.23	3.19
3	<a href="#">704-585</a>	F	1991	1,740	SRNS	CONFERENCE ROOM TRAILER	1.27	0.96	0.58	0.16	2.97
4	<a href="#">704-H</a>	H	1985	24,372	SRNS	TRAINING BUILDING	1.47	0.50	0.70	0.13	2.91
5	<a href="#">703-F</a>	F	1991	16,142	SRNS	ADMINISTRATION BUILDING	1.47	0.37	0.65	0.23	2.72
6	<a href="#">783-363</a>	G	2001	1,191	SRNS	WATER TREATMENT CONTROL ROOM	1.27	0.96	0.30	0.13	2.66
7	<a href="#">704-253</a>	S	1988	1,731	SRR	MODULAR OFFICE TRAILER	0.21	0.96	0.60	0.34	2.51
8	<a href="#">709-10</a>	G	1987	7,534	SRNS	100 AREA FIRE STATION	0.69	0.96	0.70	0.13	2.47
9	<a href="#">730-A</a>	A	1985	23,541	SRNS - SRVL	ADMINISTRATION BUILDING	1.54	0.25	0.53	0.13	2.44
10	<a href="#">702-71</a>	F	1994	16,330	SRNS	ADMINISTRATION BUILDING	1.21	0.25	0.78	0.16	2.39
11	<a href="#">704-T</a>	Z	1992	3,067	SRR	SALTSTONE OPERATIONS BUILDING	1.41	0.43	0.43	0.13	2.39
12	<a href="#">713-K</a>	K	1988	15,500	SRNS	ADMINISTRATION FACILITY	0.66	0.96	0.54	0.15	2.34
13	<a href="#">713-5M</a>	N	1983	23,181	SRNS	INSTRUMENTS, RAYTHEON AND LABORERS	0.61	0.60	0.88	0.26	2.34
14	<a href="#">705-16</a>	C	1991	14,228	SRNS	ADMINISTRATION BUILDING	0.33	1.01	0.50	0.23	2.28
15	<a href="#">702-H</a>	H	1990	15,464	SRR	ADMINISTRATION BUILDING	0.66	1.01	0.30	0.27	2.25
16	<a href="#">713-M</a>	N	1983	78,788	SRNS	SHOP BUILDING	0.61	0.60	0.60	0.37	2.18
17	<a href="#">713-E</a>	F	1994	65,081	SRNS	MAINTENANCE SHOP	0.60	0.43	0.73	0.37	2.11
18	<a href="#">780-16</a>	G	1998	4,300	USDA-PS	U.S. FOREST SERVICE HEADQUARTERS	0.61	0.25	0.98	0.25	2.09
19	<a href="#">704-K</a>	K	1994	18,721	SRNS	ADMINISTRATION BUILDING	0.73	0.78	0.40	0.15	2.06
20	<a href="#">704-805</a>	F	2001	1,725	SRNS	SUPPORT STAFF OFFICE TRAILER	0.98	0.25	0.60	0.18	2.01
21	<a href="#">704-314</a>	H	1993	13,246	SRNS	ADMINISTRATION BUILDING	0.61	0.60	0.68	0.10	1.99
22	<a href="#">704-311</a>	H	1980	16,696	SRNS	ADMINISTRATION BUILDING	0.47	1.01	0.38	0.12	1.98
23	<a href="#">725-41A</a>	A	1994	21,815	SRNS - SRVL	ADMINISTRATION BUILDING	0.68	0.25	0.65	0.16	1.54
24	<a href="#">704-210</a>	G	1991	1,725	SRNS	MODULAR OFFICE TRAILER	1.27	0.25	0.25	0.10	1.87
25	<a href="#">725-41A</a>	A	1984	21,815	SRNS - SRVL	ADMINISTRATION BUILDING	0.21	0.25	0.65	0.16	1.87
26	<a href="#">704-S</a>	S	1983	23,027	SRR	OPERATIONS BUILDING	0.66	0.78	0.30	0.12	1.66
27	<a href="#">705-76</a>	G	2000	5,825	SRNS	FIRE STATION	0.47	0.56	0.25	0.10	1.77
28	<a href="#">780-G</a>	G	1977	4,065	USDA-PS	U.S. FOREST SERVICE HEADQUARTERS	0.51	0.25	0.45	0.13	1.74
29	<a href="#">705-18</a>	B	1993	20,623	SEC	B-AREA ENGINEER SUPPORT BUILDING	0.47	0.25	0.73	0.12	1.56
30	<a href="#">703-K</a>	K	1988	17,483	SRNS	ADMINISTRATION BUILDING	0.33	0.25	0.55	0.10	1.48
31	<a href="#">725-31A</a>	A	1995	20,131	SRNS	CENTRAL RECORDS FACILITY	0.66	0.25	0.33	0.12	1.36
32	<a href="#">714-5M</a>	N	1991	17,137	SRNS	CONSTRUCTION EMPLOYMENT BUILDING	0.47	0.25	0.30	0.10	1.12
33	<a href="#">617-63</a>	G	2011	8,365	SEC	ATTA ADMINISTRATION FACILITY	0.47	0.25	0.25	0.10	1.07



## Operating Budget- 100% Indirect Funded (\$6.7M)

### Cost Distribution



#### Maintenance Costs

- Labor
- Minor Repairs to maintain existing building conditions (i.e. HVAC repairs, roof repairs)

#### Habitability Costs

- Interior Repairs
- Exterior Repairs
- Fire Panel Replacements
- HVAC Replacements

## Recent Sustainability DOE Awards

- **2017 - Rhombo Balls Project**

- 12-sided Rhombo Ball floating cover reduced the volume of water needed to meet discharge limits.
- Interlocked to form a cover to prevent algae growth

- **2019 - Drone surveillance P Reactor**

- Identified concrete cracks
- Drones reduced the energy requirements of helicopter surveillance

- **2020 - Permeable Reactive Barrier**

- Passive remediation to destroy chlorinated volatile organics



**Rhombos Balls**



**Drone**



**Permeable Reactive Barrier Injection**



## Zero Emission Vehicles: Electric Vehicles (EV) and Charging Stations

- **FY21 - Developing plan for implementation**
  - light-duty and heavy-duty vehicle replacement
  - dual charging stations sitewide
- **FY22 – 2 Additional EVs (3 Total for SRS)**
  - Construct Charging Stations for FY23
- **FY23 – 61 EVs (goal 10% of Light Duty fleet)**
- **FY30 – 611 EVs (goal 100% of Light Duty fleet)**



Charging Station Example



B Area EV Charging Station



## Sustainability and Cost Savings Initiatives

- **Road C Milled Asphalt Refurbishment Recycle (2019/2020)**
  - Approximately 21,000 tons of milled asphalt was recycled by taking it directly to reconditioning secondary gravel roads as an erosion control stabilizer.
  - This process eliminated hauling and storing the millings at the C & D Landfill until a suitable need is identified for its use. Cost avoidance of \$922K.
  - This CI Project received the Global Silver Green award from IDEAS America.
- **Road C Remove and Replace 60 Culverts (2019)**
  - It was technically feasible and the most cost-effective approach to mitigate the asbestos exposer hazard and revise the scope to leave the existing culvert drainage units in place and (1) fill each with Concrete Low Shrink Material, (2) install the new culvert and (3) cover area which resulted in a Cost avoidance of over \$440K.





## Recent Accomplishments – New HVAC System at 736-A

### Update to the 736-A, Standards Lab HVAC System



**736-A Old HVAC**



**736-A New HVAC**

## Recent History and Accomplishments – Interior Improvements to 766-H



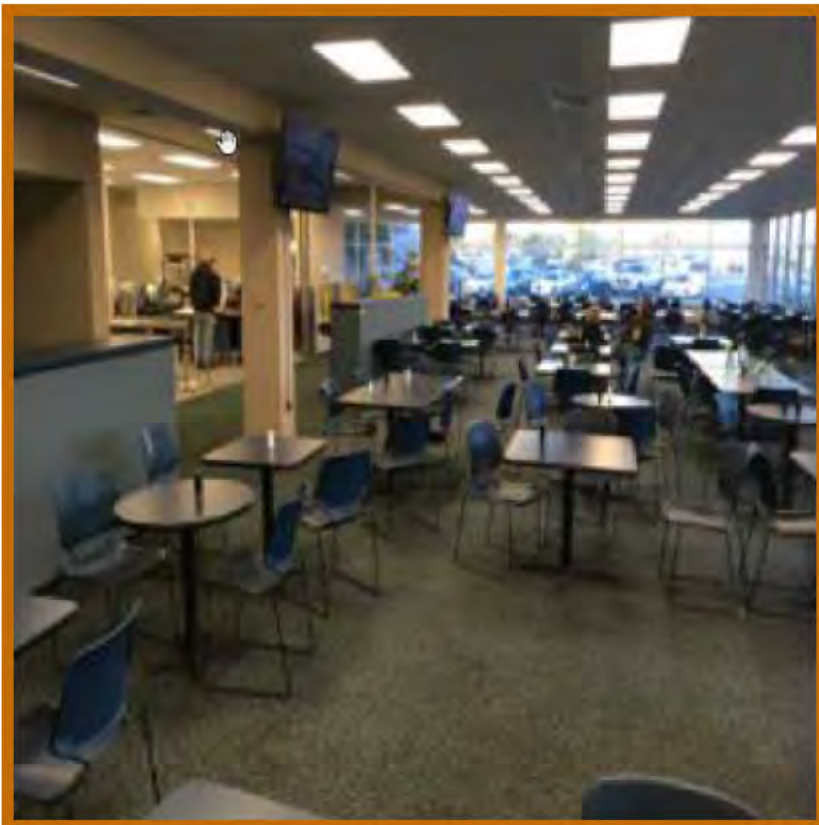
**766-H Cafeteria (Before)**



**766-H Cafeteria (After)**



## Recent History and Accomplishments – Interior Improvements to 766-H



**766-H Cafeteria (Before)**



**766-H Cafeteria (After)**

## Recent History and Accomplishments – Update to Employee Onboarding 703-47A



**703-47A Exterior (Before)**



**703-47A Renovated Exterior (After)**



## Recent History and Accomplishments – Update to Employee Onboarding 703-47A



**703-47A Renovations (Before)**



**703-47A Renovations (After) Onboarding classroom**

## Recent History and Accomplishments – 703-47A New Roof



**703-47A New Eco-White Cool Roof**



## Challenges- Interior/Exterior Building Conditions

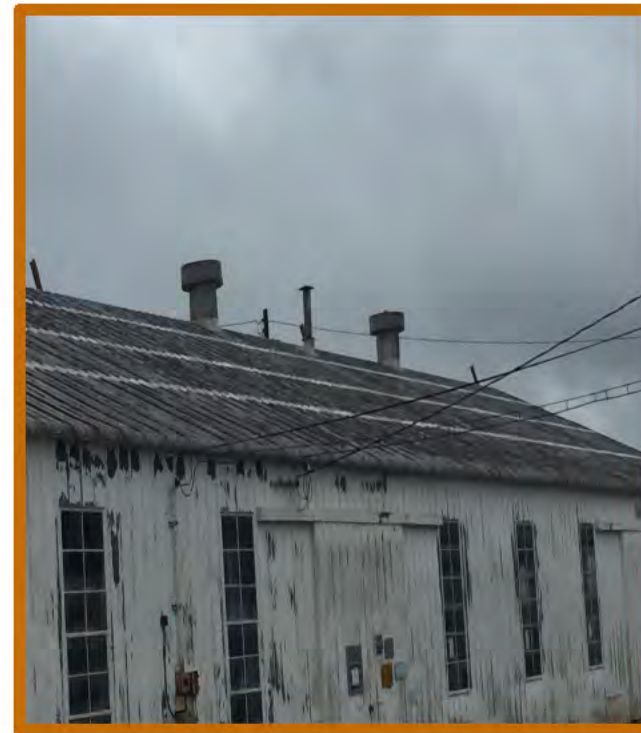
Degraded interior and exterior conditions in numerous buildings due to age and wear and tear.



**703-5B Chipped floor coating**



**707-C Damaged floor tiles**



**714-N Peeling exterior finishes**

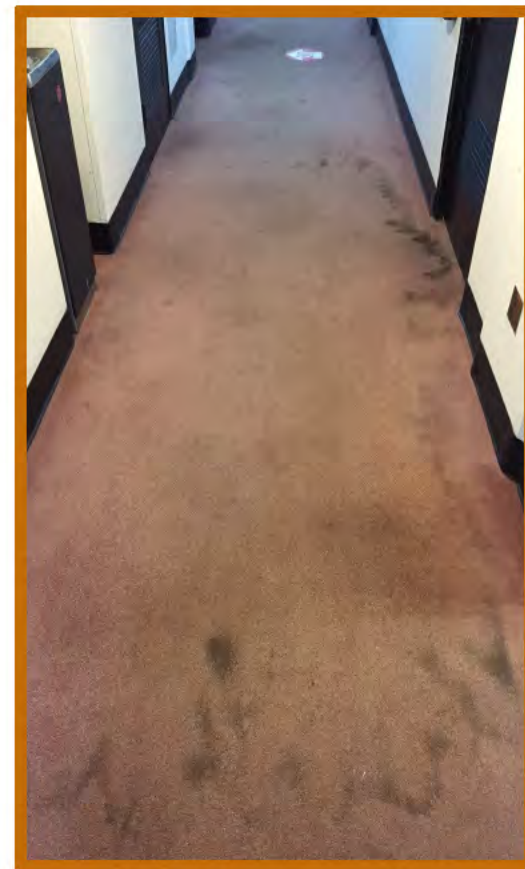
## Challenges- Interior/Exterior Building Conditions cont'd



**703-42A Water  
damaged wall  
coverings**



**717-F Degraded shop  
wall insulation**



**703-A Water-stained  
carpet**

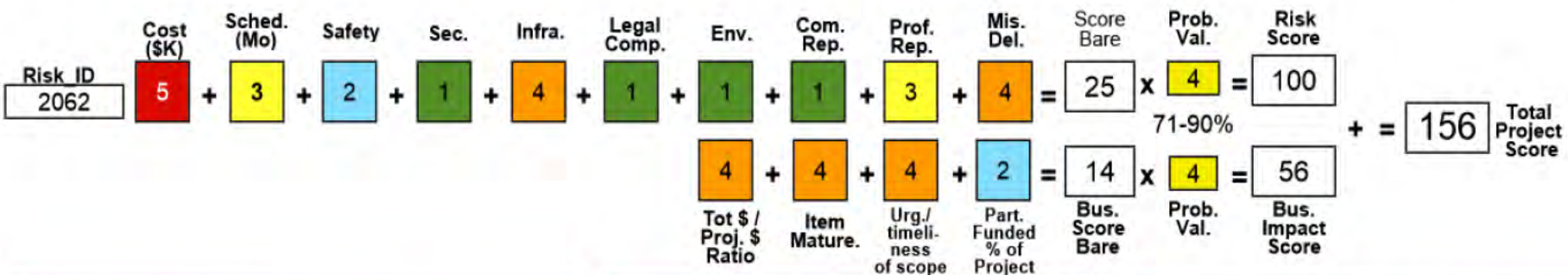


# Common Infrastructure and Utilities

## Infrastructure Projects are Prioritized by Risk Factors

**Example: Risk (2062) - Electrical equipment failure at 681-3G River Water Pumphouse causes loss of river water pumping capability.**

Project Title Replace Obsolete Switchgear 681-3G \*



Risk Consequence Categories Criteria (Score 0-5)	
Cost (\$K)	Legal/Compliance
Schedule	Environmental
Safety	Community Reputation
Security	Professional Reputation
Infrastructure	Mission Delivery

Probability Ratings		
5	Almost Certain	(P>90%)
4	Very Likely	(71%<P≤90%)
3	Likely	(31%<P≤70%)
2	Unlikely	(11%<P≤30%)
1	Very Unlikely	(1%<P≤10%)

Business Impact Grading Criteria (Score 0-5)
(Total Cost / Project Cost) Ratio
Item Maturity
Urgency / Timeliness of Scope
Partial Funding

## Conclusion



Site Services Employees Local Safety Improvement Team



New A-Area Firewater Water Pump House and Tank Completed 2020



703-46A SRS Badge Office Refurbishment Complete 2019