STATE OF WASHINGTON
DEPARTMENT OF CHILDREN, YOUTH AND FAMILIES
OFFICE OF THE SECRETARY
1500 Jefferson Street, SE ● P.O. Box 40975 ● Olympia WA 98504-0975

September 15, 2025

Director K.D. Chapman-See
Office of Financial Management
P.O. Box 43113
Olympia, WA 98504-3113

Dear Director K.D. Chapman-See:

The Department of Children, Youth, and Families (DCYF) is pleased to put forward our 2026 Supplemental Capital Budget request. The request is modest but includes critical projects exclusively focused on the juvenile rehabilitation program.

State-owned juvenile rehabilitation facilities operated by DCYF include three secure institutions and eight community facilities. Our facilities are a critical component of our agency's work to rehabilitate young people who are in our care and custody. Having secure, operational facilities also serves the people of Washington by fulfilling the public's expectations for safe communities.

DCYF's requests are necessary for the safety, security, health and well-being of staff and residents at our juvenile rehabilitation institutions. Our primary request is the purchase of 'Parkland,' a 16-bed medium-security facility located in Pierce County that will have a mental health treatment focus. This facility will add capacity to increase safety and reduce overcrowding at Green Hill School, while moving in the direction of best practice by having smaller facilities for the emerging adult population. Additionally, we request the replacement of the HVAC systems at Green Hill School and at several community facilities. These HVAC systems are outdated and replacement is vital for the health and well-being of young people in our care, as well as staff, particularly as wildfires become more prominent in our state. Lastly, the request includes funding for the final phase of the perimeter security improvements at Echo Glen Children's Center.

DCYF's modest capital requests will help ensure that young people in our care and custody live in a well-maintained space that is both therapeutic and safe.

Best,

Tana Senn, Secretary

cc: Rene Newkirk, Chief Financial Officer
Breann Boggs, Deputy CFO
Jim Smith, Budget Director
Michael Poier, Capital Programs Administrator

Department of Children, Youth and Families

Capital Programs - 2026 Supplemental Capital Budget Request 9/10/2025

Dollars in Thousands

Priority	Location	Project Title	Funded 25-27	2026	Description
1	*Green Hill School*	GHS HVAC Upgrades	4,500	5,800	Remainder of HVAC upgrades campus-wide
2	*New*	Parkland Facility Purchase	0	3,000	Purchase Parkland Facility from Multicare for JR use
3	*Green Hill School*	GHS Security/Locks Sleeping Rooms	0	1,800	Upgrade doors/frames/locks on sleeping rooms to maintain security level to reflect need based on current and future resident profile
4	*Minor Works Projects*	Multiple Minor Works Project Additions	2,618	2,620	Multiple minor works sub-projects - see detail below
	MW - Echo Glen Childrens Center	EGCC Living unit Roof replacements	800		$840,000 - Continue replacing failing roofs on existing living units
	MW - Statewide Community Facilities	HVAC Replacement/Upgrades	418		$440,000 - Continue to upgrade and replace HVAC systems at community facilities statewide
	MW - Canyon View Community Facility	Sleeping Room Fire Suppression System Upgrades	0		$250,000 - Install new fire sprinkler system in sleeping rooms
	MW - Ridgeview Community Facility	Roof and Window Replacements	0		$490,000 - Replace entire roof and select single pane windows with energy efficient dual pane windows
	MW - Statewide Community Facilities	SW Electrical Panel Uprgrades - Arc Flash	600		$600,000 - Continue to replace/upgrade electrical panels at community facilities statewide
5	*Echo Glen Childrens Center*	EGCC Security Improvements	800	1,700	Remainder of security improvements including parking lot, stormwater, and lighting
		Total		**14,920**	

OFM

307 - Department of Children, Youth, and Families
Ten Year Capital Plan by Project Priority
2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS001
Date Run: 9/15/2025 11:29AM

Project by Agency Priority

Priority	Project by Account-EA Type	Estimated Total	Prior Expenditures	Current Expenditures	Reapprop 2025-27	New Approp 2025-27	Estimated 2027-29	Estimated 2029-31	Estimated 2031-33	Estimated 2033-35
1	**40000584 Green Hill School HVAC Upgrades**									
	057-1 State Bldg Constr-State 26C-1 Climate Commit Accou-State	5,800,000				5,800,000				
	Project Total:	**5,800,000**				**5,800,000**				
2	**40000612 Purchase Parkland Facility**									
	057-1 State Bldg Constr-State	3,000,000				3,000,000				
3	**40000615 Green Hill School Security Doors/Locks Sleeping Rooms**									
	057-1 State Bldg Constr-State	1,800,000				1,800,000				
4	**40000614 Statewide Minor Works**									
	057-1 State Bldg Constr-State	2,620,000				2,620,000				
5	**40000546 Echo Glen Secure Facility Improvements**									
	057-1 State Bldg Constr-State	1,700,000				1,700,000				
	Total	**14,920,000**				**14,920,000**				

Total Account Summary

Account-Expenditure Authority Type	Estimated Total	Prior Expenditures	Current Expenditures	Reapprop 2025-27	New Approp 2025-27	Estimated 2027-29	Estimated 2029-31	Estimated 2031-33	Estimated 2033-35
057-1 State Bldg Constr-State 26C-1 Climate Commit Accou-State	14,920,000				14,920,000				
Total	**14,920,000**				**14,920,000**				

OFM

Ten Year Capital Plan by Project Priority

2025-27 Biennium

*

Report Number: CBS001
Date Run: 9/15/2025 11:29AM

Parameter	Entered As	Interpreted As
Biennium	2025-27	2025-27
Functional Area	*	All Functional Areas
Agency	307	307
Version	27-A	27-A
Project Classification	*	All Project Classifications
Include Enacted	No	No
Sort Order	Project Priority	Priority
Include Page Numbers	Y	Yes
For Word or Excel	N	N
User Group	Agency Budget	Agency Budget
User Id	*	All User Ids

OFM

307 - Department of Children, Youth, and Families
Capital Project Request

2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: **40000584**
Project Title: **Green Hill School HVAC Upgrades**

Description

Starting Fiscal Year: 2026
Project Class: Preservation (State-Owned)
Agency Priority: 1

Project Summary

The Department Children Youth & Families (DCYF) Juvenile Rehabilitation (JR) serves Washington state's highest-risk young people, who are convicted of crimes that reflect the profound violence, neglect, trauma, addiction, and other challenges they faced before they reach JR's doors. The goal of JR is to deliver treatment, provide resources, and develop skills so young people can plan for their future and reenter their communities. JR serves young people up to 25 years old who are committed to juvenile custody by a court. Since the "JR to 25" legislation was passed in 2018, the population is older, has longer sentences, has more connections with gangs, and has a greater history of criminality.

Project Description

The 2025-27 Biennial Budget funded $4.5m of the $10.8m requested for HVAC upgrades at Green Hill School leaving the agency with $5.8m remaining funds needed to ensure completion of the remaining buildings on campus. The agency is requesting these funds in order to fund the project to successful completion. By funding this project now, the state will save future costs for separate construction phases, bidding and mobilization costs. This allows the campus to transition to a new energy efficient/clean buildings compliant heating and cooling system and to transition away from fossil fuel-based systems. Under the current design DCYF has selected a clean energy/clean buildings compliant energy management design that is projected to save the state over $20k per year in utility costs.

Green Hill School is the state's largest and oldest Juvenile Correctional Institution in the state of Washington. The department commissioned an evaluation of the campus HVAC system as it relates to ventilation quality vis a vis airborne communicable virus, etc. Based on that report the Department requested funding to replace the failing dx condenser units in the primary occupied living unit buildings on campus (S, M,H) plus the IMU and other support buildings such as Medical and building F and A.

This project would complete the remaining buildings on campus designed by the report to be replaced (IMU,Health Services, F, V, D,L and A buildings on campus with an energy efficient C02 VRF systems and building system controls for cooling and heating.

Location

City: Chehalis **County:** Lewis **Legislative District:** 020

Project Type

Major Projects-Infrastr Replacemnt

Growth Management impacts

There are no known GMA impacts

Funding

Acct Code	Account Title	Estimated Total	Expenditures Prior Biennium	Expenditures Current Biennium	2025-27 Fiscal Period Reapprops	2025-27 Fiscal Period New Approps
057-1	State Bldg Constr-State	5,800,000				5,800,000
26C-1	Climate Commit Accou-State					
	Total	**5,800,000**	**0**	**0**	**0**	**5,800,000**

OFM

307 - Department of Children, Youth, and Families
Capital Project Request

2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: **40000584**
Project Title: **Green Hill School HVAC Upgrades**

Funding

		Future Fiscal Periods			
		2027-29	**2029-31**	**2031-33**	**2033-35**
057-1	State Bldg Constr-State				
26C-1	Climate Commit Accou-State				
	Total	**0**	**0**	**0**	**0**

Operating Impacts

No Operating Impact

Narrative

This project does not drive operating FTE increases

OFM

307 - Department of Children, Youth, and Families
Capital Project Request

2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: **40000612**
Project Title: **Purchase Parkland Facility**

Description

Starting Fiscal Year: 2026
Project Class: Other
Agency Priority: 2

Project Summary

The Department Children Youth & Families (DCYF) Juvenile Rehabilitation (JR) serves Washington state's highest-risk young people, who are convicted of crimes that reflect the profound violence, neglect, trauma, addiction, and other challenges they faced before they ever reached our doors. The goal of JR is to deliver treatment, provide resources, and develop skills so young people can plan for their future and reenter their communities. JR serves young people up to 25 years old who are committed to juvenile custody by a court. Since the “JR to 25” legislation was passed in 2018, the population is older, has longer sentences, has more connections with gangs, and has a greater history of criminality.

Project Description

This project requests funding for the purchase of land and buildings located in Parkland Washington for additional rehabilitation bed capacity. DCYF must expand its continuum of JR institutions to create more placements for individuals with medium-security classifications, mental health needs, and create overall capacity. DCYF requires capital funding to establish additional locations that focus on acute mental health treatment and create additional capacity to increase safety and reduce overcrowding at Green Hill School.

Focusing on clinician care for young people with mental health or substance abuse diagnosis may improve outcomes. Focusing on mental health and substance abuse care will reduce symptoms, prevent re-traumatization, and lower recidivism rates. A more professional, clinician-led approach to serving young people in JR facilities who experience mental health challenges can significantly improve outcomes. This approach has been shown to reduce mental health and substance abuse symptoms, minimize the use of room confinement and restraints, prevent re-traumatization, and lower recidivism rates. JR must increase the capacity for this type of service for young people, whose interactions with the criminal justice system make it impossible for them to receive treatment elsewhere. This request supports DCYFs strategic priority of Eliminating Racial Disproportionality and Advance Racial Equity. The Parkland Institution will be a medium/minimum facility run at a safe operating capacity of 15-beds with one flex bed. Parkland will serve as an interim placement in the larger JR continuum helping to divert young people from maximum-security institutional settings. Young people served by these facilities may effectively “step down” to Community Facilities or Community Transition Services following placement at Parkland. Improved health outcomes for individuals served small, community-based facilities with a particular focus on treatment has been shown to decrease recidivism, improve educational outcomes, and reduce the number of critical incidents experienced by both young people and the staff who care for them.

Location

City: Tacoma **County:** Pierce **Legislative District:** 039

Project Type

Other - Unidentified

Growth Management impacts

No known GMA impacts from this project

Funding

Acct Code	Account Title	Estimated Total	Expenditures Prior Biennium	Current Biennium	2025-27 Fiscal Period Reapprops	New Approps
057-1	State Bldg Constr-State	3,000,000				3,000,000
	Total	**3,000,000**	**0**	**0**	**0**	**3,000,000**

OFM

307 - Department of Children, Youth, and Families
Capital Project Request

2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: **40000612**
Project Title: **Purchase Parkland Facility**

Funding

		Future Fiscal Periods			
		2027-29	2029-31	2031-33	2033-35
057-1	State Bldg Constr-State				
	Total	**0**	**0**	**0**	**0**

Operating Impacts

No Operating Impact

Narrative

There are no operating impacts from this project to purchase land and buildings. Future operating costs will be included in the agency's operating budget request as soon as the building becomes available for occupancy

OFM

307 - Department of Children, Youth, and Families
Capital Project Request

2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: **40000615**
Project Title: **Green Hill School Security Doors/Locks Sleeping Rooms**

Description

Starting Fiscal Year: 2026
Project Class: Program Improvement (State-Owned)
Agency Priority: 3

Project Summary

The Department Children Youth & Families (DCYF) Juvenile Rehabilitation (JR) serves Washington state's highest-risk young people, who are convicted of crimes that reflect the profound violence, neglect, trauma, addiction, and other challenges they faced before they reach our doors. The goal of JR is to deliver treatment, provide resources, and develop skills so young people can plan for their future and reenter their communities. JR serves young people up to 25 years old who are committed to juvenile custody by a court. Since the “JR to 25” legislation was passed in 2018, the population is older, has longer sentences, has more connections with gangs, and has a greater history of criminality.

Project Description

This project replaces the maximum security sleeping room doors and locks in three of the Green Hill School (GHS) living units. These living units were constructed in the mid-1990s, are 30 plus years old, and are subject to abuse and wear and tear. Given GHS serves some of the state's most violent and behaviorally challenging youth in our state ensuring the safety of youth, staff and general public is our top priority. Unfortunately, many of these doors have become bent, warped and locks have started to fail on regular basis. This situation poses a serious safety risk. Therefore, this request is critical to maintaining a safe environment and upholding our mission.

Location

City: Chehalis **County:** Lewis **Legislative District:** 020

Project Type

Program Improvement - Unidentified

Growth Management impacts

No GMA impacts

New Facility: No

Funding

Acct Code	Account Title	Estimated Total	Expenditures Prior Biennium	Current Biennium	2025-27 Fiscal Period Reapprops	New Approps
057-1	State Bldg Constr-State	1,800,000				1,800,000
	Total	**1,800,000**	**0**	**0**	**0**	**1,800,000**

Acct Code	Account Title	Future Fiscal Periods 2027-29	2029-31	2031-33	2033-35
057-1	State Bldg Constr-State				
	Total	**0**	**0**	**0**	**0**

Operating Impacts

No Operating Impact

307 - Department of Children, Youth, and Families
Capital Project Request
2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: **40000615**
Project Title: **Green Hill School Security Doors/Locks Sleeping Rooms**

Operating Impacts

Narrative

This project doesn't drive additional operating costs

OFM

307 - Department of Children, Youth, and Families
Capital Project Request

2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: **40000614**
Project Title: **Statewide Minor Works**

Description

Starting Fiscal Year: 2026
Project Class: Preservation (State-Owned)
Agency Priority: 4

Project Summary

The Department Children Youth & Families (DCYF) Juvenile Rehabilitation (JR) serves Washington state's highest-risk young people, who are convicted of crimes that reflect the profound violence, neglect, trauma, addiction, and other challenges they faced before they reach our doors. The goal of JR is to deliver treatment, provide resources, and develop skills so young people can plan for their future and reenter their communities. JR serves young people up to 25 years old who are committed to juvenile custody by a court. Since the “JR to 25” legislation was passed in 2018, the population is older, has longer sentences, has more connections with gangs, and has a greater history of criminality.

Project Description

This request is for statewide minor works projects for the 2026 Capital Supplemental budget. Per instructions from the Office Financial Management (OFM) in July 2025 minor works project requests for this budget have been consolidated into a single project list. For the 2026 Supplemental Capital Budget DCYF is requesting funding for the following projects:

1. $840,000 for roof replacements on living units at Echo Glen Children's Center. As part of our ongoing efforts to preserve the life of critical buildings on the Echo Glen campus this project will replace two additional roofs on resident living unit buildings based on an onsite assessment and triage of condition of the roof system.

2. $440,000 for HVAC replacements at Community Facilities. This project replaces older end of life HVAC systems at two JR community facilities with modern energy efficient HVAC systems. This will reduce energy costs and ensure ongoing heating and cooling during hot and cold weather months.

3. $250,000 for fire suppression/sprinkler system at Canyonview Community Facility in Wenatchee. This project upgrades the fire suppression system in the sleeping rooms at Canyonview from smoke detection to a modern code compliant smoke and fire sprinkler system.

4. $490,000 for roof and window replacements at Ridgeview Community Facility in Yakima. This project replaces the old roof with a new roof and replaces select older aluminum windows with new modern energy efficient windows in order to extend the life of the building and improve the energy efficiency of the heating and cooling during hot and cold weather months.

5. $600,000 for ARC flash electrical panel upgrades. This project continues the replacement of old electrical panels with modern ARC flash code compliant electrical panels as part of the agency's effort to improve fire safety at its older community facilities.

Location

City: East Wenatchee	**County:** Chelan	**Legislative District:** 007
City: Lakewood	**County:** Pierce	**Legislative District:** 028
City: Snoqualmie	**County:** King	**Legislative District:** 005
City: Yakima	**County:** Yakima	**Legislative District:** 015

Project Type

Minor Works Preservation List

OFM

307 - Department of Children, Youth, and Families
Capital Project Request

2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: **40000614**
Project Title: **Statewide Minor Works**

Description

Growth Management impacts

No GMA impacts

Funding

Acct Code	Account Title	Estimated Total	Expenditures Prior Biennium	Expenditures Current Biennium	2025-27 Fiscal Period Reapprops	2025-27 Fiscal Period New Approps
057-1	State Bldg Constr-State	2,620,000				2,620,000
	Total	**2,620,000**	**0**	**0**	**0**	**2,620,000**

Acct Code	Account Title	Future Fiscal Periods 2027-29	2029-31	2031-33	2033-35
057-1	State Bldg Constr-State				
	Total	**0**	**0**	**0**	**0**

Operating Impacts

No Operating Impact

Narrative

These minor works projects preserve existing building structures and do no drive operating budget impacts

OFM

307 - Department of Children, Youth, and Families
Capital Project Request

2025-27 Biennium

*

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: **40000546**
Project Title: **Echo Glen Secure Facility Improvements**

Description

Starting Fiscal Year: 2026
Project Class: Program Improvement (State-Owned)
Agency Priority: 5

Project Summary

The Department Children Youth & Families (DCYF) Juvenile Rehabilitation (JR) serves Washington state's highest-risk young people, who are convicted of crimes that reflect the profound violence, neglect, trauma, addiction, and other challenges they faced before they ever reached JR's doors. The goal of JR is to deliver treatment, provide resources, and develop skills so young people can plan for their future and reenter their communities. JR serves young people up to 25 years old who are committed to juvenile custody by a court. Since the "JR to 25" legislation was passed in 2018, the population is older, has longer sentences, has more connections with gangs, and has a greater history of criminality.

Project Description

During the permitting process for the fence project at Echo Glen Children's Center the Authority Having Jurisdiction King County required the department to construct a multi-phase sand filter and underground stormwater detention vaults to capture stormwater runoff from the site. The Department did not anticipate needing to have this type of stormwater treatment facility in its design of the fence project. This new requirement by King County represents and extraordinary cost that cannot be absorbed with existing project funds. Therefore, DCYF is requesting additional funding to comply with the King County permit requirement.

Location

City: Snoqualmie **County:** King **Legislative District:** 005

Project Type

Major Projects-Infrastr Enhancement

Growth Management impacts

No known GMA impacts

New Facility: No

Funding

Acct Code	Account Title	Estimated Total	Expenditures Prior Biennium	Current Biennium	2025-27 Fiscal Period Reapprops	New Approps
057-1	State Bldg Constr-State	1,700,000				1,700,000
	Total	**1,700,000**	**0**	**0**	**0**	**1,700,000**

Acct Code	Account Title	Future Fiscal Periods 2027-29	2029-31	2031-33	2033-35
057-1	State Bldg Constr-State				
	Total	**0**	**0**	**0**	**0**

Operating Impacts

No Operating Impact

Version: 27 DCYF Supplemental Capital Budget

Report Number: CBS002
Date Run: 9/9/2025 9:45AM

Project Number: 40000546
Project Title: Echo Glen Secure Facility Improvements

Operating Impacts

Narrative

No known additional operating FTE necessary

OFM

Capital Project Request

2025-27 Biennium

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Parameter	Entered As	Interpreted As
Biennium	2025-27	2025-27
Agency	307	307
Version	27-A	27-A
Project Classification	*	All Project Classifications
Capital Project Number	40000584, 40000612, 40000615, 4000(	40000584, 40000612, 40000615, 4000(
Sort Order	Project Priority	Priority
Include Page Numbers	Y	Yes
For Word or Excel	N	N
User Group	Agency Budget	Agency Budget
User Id	*	All User Ids

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated June 2025

Agency	Department Children Youth & Families
Project Name	Parkland Facility Purchase
OFM Project Number	40000612

Contact Information	
Name	Michael Poier
Phone Number	360-764-0253
Email	Michael Poier

Statistics			
Gross Square Feet	8,471	MACC per Gross Square Foot	$0
Usable Square Feet		Escalated MACC per Gross Square Foot	$0
Alt Gross Unit of Measure			
Space Efficiency	0.0%	A/E Fee Class	B
Construction Type	Detention/correctional f	A/E Fee Percentage	14.08%
Remodel	No	Projected Life of Asset (Years)	
Additional Project Details			
Procurement Approach	DBB	Art Requirement Applies	No
Inflation Rate	3.16%	Higher Ed Institution	No
Sales Tax Rate %	10.00%	Location Used for Tax Rate	
Contingency Rate	5%		
Base Month (Estimate Date)	July-26	OFM UFI# (from FPMT, if available)	
Project Administered By	DES		

Schedule			
Predesign Start		Predesign End	
Design Start		Design End	
Construction Start		Construction End	
Construction Duration	0 Months		

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Project Cost Summary

Total Project	$3,000,000	Total Project Escalated	$3,000,000
		Rounded Escalated Total	$3,000,000

Amount funded in Prior Biennia	**$0**
Amount in current Biennium	**$0**
Next Biennium	**$0**
Out Years	**$3,000,000**

Acquisition			
Acquisition Subtotal	**$3,000,000**	**Acquisition Subtotal Escalated**	**$3,000,000**

Consultant Services			
Predesign Services	$0		
Design Phase Services	$0		
Extra Services	$0		
Other Services	$0		
Design Services Contingency	$0		
Consultant Services Subtotal	**$0**	**Consultant Services Subtotal Escalated**	**$0**

Construction			
Maximum Allowable Construction Cost (MACC)	$0	Maximum Allowable Construction Cost (MACC) Escalated	$0
DBB Risk Contingencies	$0		
DBB Management	$0		
Owner Construction Contingency	$0		$0
Non-Taxable Items	$0		$0
Sales Tax	$0	Sales Tax Escalated	$0
Construction Subtotal	**$0**	**Construction Subtotal Escalated**	**$0**

Equipment			
Equipment	$0		
Sales Tax	$0		
Non-Taxable Items	$0		
Equipment Subtotal	**$0**	**Equipment Subtotal Escalated**	**$0**

Artwork			
Artwork Subtotal	**$0**	**Artwork Subtotal Escalated**	**$0**

Agency Project Administration			
Agency Project Administration Subtotal	$0		
DES Additional Services Subtotal	$0		
Other Project Admin Costs	$0		
Project Administration Subtotal	**$0**	**Project Administration Subtotal Escalated**	**$0**

Other Costs			
Other Costs Subtotal	**$0**	**Other Costs Subtotal Escalated**	**$0**

Project Cost Estimate			
Total Project	**$3,000,000**	Total Project Escalated	**$3,000,000**
		Rounded Escalated Total	**$3,000,000**

Funding Summary

	Project Cost (Escalated)	Funded in Prior Biennia	Current Biennium 2025-2027	2027-2029	Out Years
Acquisition					
Acquisition Subtotal	$3,000,000				**$3,000,000**
Consultant Services					
Consultant Services Subtotal	$0				**$0**
Construction					
Construction Subtotal	$0				**$0**
Equipment					
Equipment Subtotal	$0				**$0**
Artwork					
Artwork Subtotal	$0				**$0**
Agency Project Administration					
Project Administration Subtotal	$0				**$0**
Other Costs					
Other Costs Subtotal	$0				**$0**
Project Cost Estimate					
Total Project	**$3,000,000**	**$0**	**$0**	**$0**	**$3,000,000**
	$3,000,000	**$0**	**$0**	**$0**	**$3,000,000**
	Percentage requested as a new appropriation		**0%**		

What is planned for the requested new appropriation? (*Ex. Acquisition and design, phase 1 construction, etc.*)
Insert Row Here

What has been completed or is underway with a previous appropriation?
Insert Row Here

What is planned with a future appropriation?
Insert Row Here

Cost Estimate Details

Acquisition Costs					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Purchase/Lease	$3,000,000				
Appraisal and Closing					
Right of Way					
Demolition					
Pre-Site Development					
Other					
Insert Row Here					
ACQUISITION TOTAL	**$3,000,000**		**NA**	**$3,000,000**	

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STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated June 2024

Agency	Department Children Youth & Families	
Project Name	Green Hill School HVAC	
OFM Project Number	40000584	

Contact Information		
Name	Trent Phillips	
Phone Number	360-764-0711	
Email	Trent Phillips	

Statistics			
Gross Square Feet		MACC per Gross Square Foot	
Usable Square Feet		Escalated MACC per Gross Square Foot	
Alt Gross Unit of Measure			
Space Efficiency		A/E Fee Class	A
Construction Type	Detention/correctional f	A/E Fee Percentage	13.73%
Remodel	Yes	Projected Life of Asset (Years)	
Additional Project Details			
Procurement Approach	DBB	Art Requirement Applies	No
Inflation Rate	3.33%	Higher Ed Institution	
Sales Tax Rate %	10.00%	Location Used for Tax Rate	Lewis
Contingency Rate	5%		
Base Month (Estimate Date)	September-25	OFM UFI# (from FPMT, if available)	
Project Administered By	DES		

Schedule			
Predesign Start		Predesign End	
Design Start	July-25	Design End	March-26
Construction Start	June-26	Construction End	March-27
Construction Duration	9 Months		

Green cells must be filled in by user

Project Cost Summary

Total Project	$5,800,297	Total Project Escalated	$5,964,310
		Rounded Escalated Total	$5,964,000

Amount funded in Prior Biennia	**$0**
Amount in current Biennium	**$10,031,000**
Next Biennium	**$0**
Out Years	**-$4,067,000**

Acquisition			
Acquisition Subtotal	**$0**	**Acquisition Subtotal Escalated**	**$0**

Consultant Services			
Predesign Services	$0		
Design Phase Services	$441,664		
Extra Services	$0		
Other Services	$198,429		
Design Services Contingency	$32,005		
Consultant Services Subtotal	**$672,097**	**Consultant Services Subtotal Escalated**	**$682,430**

Construction			
Maximum Allowable Construction Cost (MACC)	$4,440,000	Maximum Allowable Construction Cost (MACC) Escalated	$4,571,628
DBB Risk Contingencies	$0		
DBB Management	$0		
Owner Construction Contingency	$222,000		$230,081
Non-Taxable Items	$0		$0
Sales Tax	$466,200	Sales Tax Escalated	$480,171
Construction Subtotal	**$5,128,200**	**Construction Subtotal Escalated**	**$5,281,880**

Equipment			
Equipment	$0		
Sales Tax	$0		
Non-Taxable Items	$0		
Equipment Subtotal	**$0**	**Equipment Subtotal Escalated**	**$0**

Artwork			
Artwork Subtotal	**$0**	**Artwork Subtotal Escalated**	**$0**

Agency Project Administration			
Agency Project Administration Subtotal	$0		
DES Additional Services Subtotal	$0		
Other Project Admin Costs	$0		
Project Administration Subtotal	**$0**	**Project Administration Subtotal Escalated**	**$0**

Other Costs			
Other Costs Subtotal	**$0**	**Other Costs Subtotal Escalated**	**$0**

Project Cost Estimate			
Total Project	**$5,800,297**	Total Project Escalated	**$5,964,310**
		Rounded Escalated Total	**$5,964,000**

Funding Summary

	Project Cost (Escalated)	Funded in Prior Biennia	Current Biennium 2025-2027	2027-2029	Out Years
Acquisition					
Acquisition Subtotal	$0				**$0**
Consultant Services					
Consultant Services Subtotal	$682,430		$1,167,990		**-$485,560**
Construction					
Construction Subtotal	$5,281,880		$8,862,847		**-$3,580,967**
Equipment					
Equipment Subtotal	$0				**$0**
Artwork					
Artwork Subtotal	$0				**$0**
Agency Project Administration					
Project Administration Subtotal	$0				**$0**
Other Costs					
Other Costs Subtotal	$0				**$0**
Project Cost Estimate					
Total Project	**$5,964,310**	**$0**	**$10,030,837**	**$0**	**-$4,066,527**
	$5,964,000	**$0**	**$10,031,000**	**$0**	**-$4,067,000**
	Percentage requested as a new appropriation		**168%**		

What is planned for the requested new appropriation? (*Ex. Acquisition and design, phase 1 construction, etc.*)
Insert Row Here

What has been completed or is underway with a previous appropriation?
Insert Row Here

What is planned with a future appropriation?
Insert Row Here

Cost Estimate Details

Consultant Services				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
1) Pre-Schematic Design Services				
Programming/Site Analysis				
Environmental Analysis				
Predesign Study				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0000**	**$0**	Escalated to Design Start
2) Construction Documents				
A/E Basic Design Services	$441,664			69% of A/E Basic Services
Other				
Insert Row Here				
Sub TOTAL	**$441,664**	**1.0044**	**$443,608**	Escalated to Mid-Design
3) Extra Services				
Civil Design (Above Basic Svcs)				
Geotechnical Investigation				
Commissioning				
Site Survey				
Testing				
LEED Services				
Voice/Data Consultant				
Value Engineering				
Constructability Review				
Environmental Mitigation (EIS)				
Landscape Consultant				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0044**	**$0**	Escalated to Mid-Design
4) Other Services				
Bid/Construction/Closeout	$198,429			31% of A/E Basic Services
HVAC Balancing				
Staffing				
Other				
Insert Row Here				
Sub TOTAL	**$198,429**	**1.0364**	**$205,652**	Escalated to Mid-Const.
5) Design Services Contingency				
Design Services Contingency	$32,005			
Other				
Insert Row Here				
Sub TOTAL	**$32,005**	**1.0364**	**$33,170**	Escalated to Mid-Const.

CONSULTANT SERVICES TOTAL	**$672,097**		**$682,430**	

Green cells must be filled in by user

Cost Estimate Details

Construction Contracts				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
1) Site Work				
G10 - Site Preparation	$25,000			
G20 - Site Improvements	$800,000			
G30 - Site Mechanical Utilities	$700,000			
G40 - Site Electrical Utilities	$770,000			
G60 - Other Site Construction				
Other				
Insert Row Here				
Sub TOTAL	**$2,295,000**	**1.0238**	**$2,349,621**	
2) Related Project Costs				
Offsite Improvements	$25,000			
City Utilities Relocation	$50,000			
Parking Mitigation				
Stormwater Retention/Detention	$10,000			
Other				
Insert Row Here				
Sub TOTAL	**$85,000**	**1.0238**	**$87,023**	
3) Facility Construction				
A10 - Foundations				
A20 - Basement Construction				
B10 - Superstructure				
B20 - Exterior Closure				
B30 - Roofing				
C10 - Interior Construction				
C20 - Stairs				
C30 - Interior Finishes				
D10 - Conveying				
D20 - Plumbing Systems				
D30 - HVAC Systems	$1,250,000			
D40 - Fire Protection Systems				
D50 - Electrical Systems				
F10 - Special Construction				
F20 - Selective Demolition	$60,000			
General Conditions	$750,000			
Other Direct Cost				
Insert Row Here				
Sub TOTAL	**$2,060,000**	**1.0364**	**$2,134,984**	
4) Maximum Allowable Construction Cost				
MACC Sub TOTAL	**$4,440,000**		**$4,571,628**	
	NA		*NA per 0*	

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7) Owner Construction Contingency				
Allowance for Change Orders	$222,000			
Other				
Insert Row Here				
Sub TOTAL	**$222,000**	**1.0364**	**$230,081**	
8) Non-Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0364**	**$0**	
9) Sales Tax				
Sub TOTAL	**$466,200**		**$480,171**	
CONSTRUCTION CONTRACTS TOTAL	**$5,128,200**		**$5,281,880**	

Green cells must be filled in by user

July 16, 2025

Washington State Department of Commerce
2001 6th Avenue
Suite #2600
Seattle, WA 98121

ATTENTION [name]

REGARDING Green Hill School: State Campus District Energy System Decarbonization Plan, Campus HVAC Upgrades

Dear Sirs,

The attached State Campus District Energy System Decarbonization Plan is submitted on behalf of Green Hill School, a Washington State Department of Children Youth and Families site operated by the Washington State Department of Corrections and owned by Washington State. This effort is part of the Green Hill School Campus HVAC Upgrades project, the design of which is contracted with Hargis Engineers by the Washington State Department of Enterprise Services (DES), of whom Lisa Horn is the Project Manager.

If you have any questions, or comments, please do not hesitate to contact our office so that we may address and resolve related compliance items promptly.

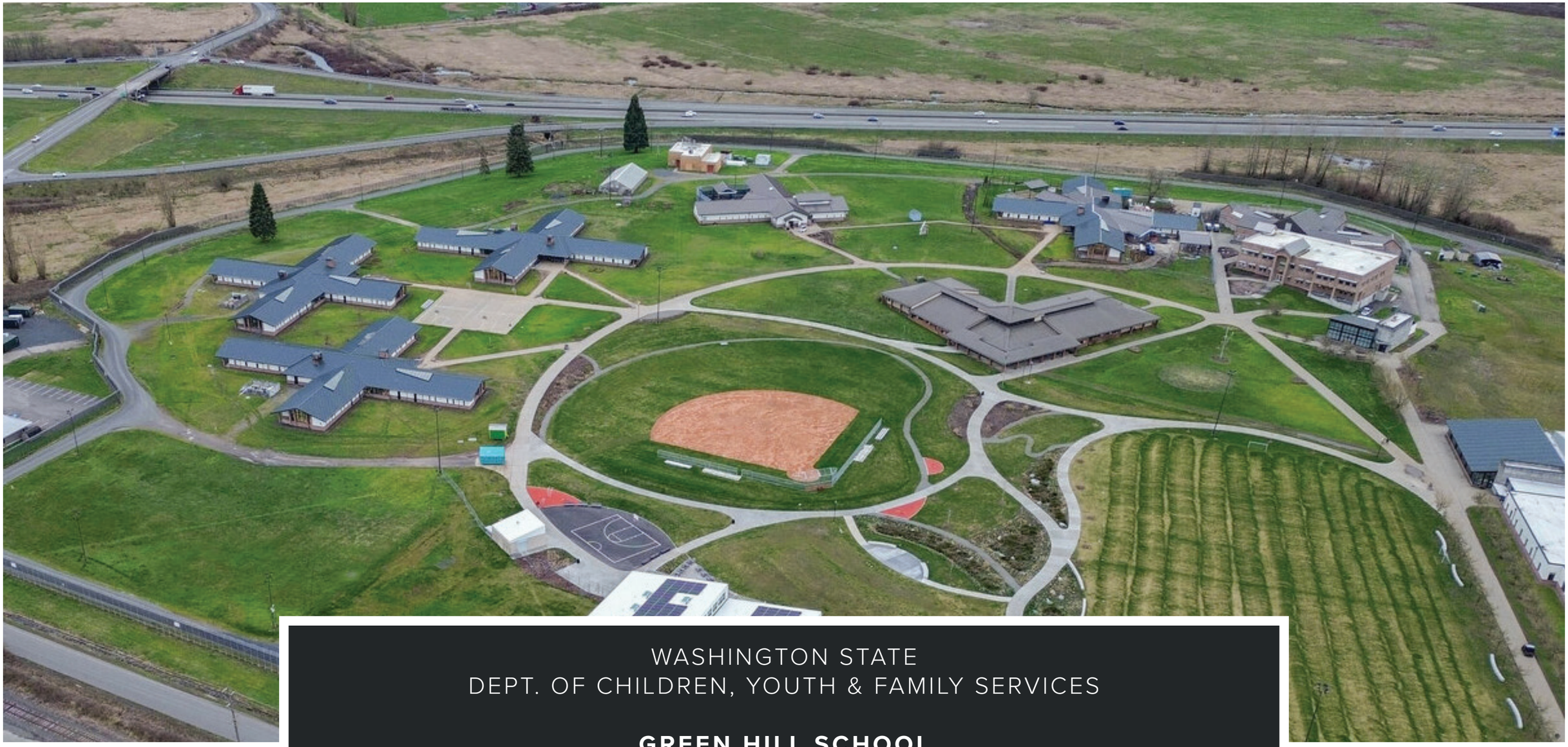
On behalf of HARGIS ENGINEERS,

Ron Eliason
Michael Baranick
Robert Kuchcinski

Attachments:
Green Hill School State Campus District Energy System Decarbonization Plan

HARGIS
1201 third avenue, ste 600
seattle, washington 98101
206.448.3376

www.hargis.biz



WASHINGTON STATE
DEPT. OF CHILDREN, YOUTH & FAMILY SERVICES

GREEN HILL SCHOOL
STATE CAMPUS DISTRICT ENERGY SYSTEM
DECARBONIZATION PLAN

PROJECT NO. : 2024-342

prepared by

HARGIS

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This State Campus District Energy System Decarbonization Plan for the Green Hill School campus is submitted in compliance with Washington State House Bill 1390 and the Clean Buildings Performance Standard. Green Hill School is a Washington State Department of Children, Youth, and Families site, operated by the Washington State Department of Corrections and owned by the State of Washington.

The Decarbonization Plan involves a phased approach to replacing air handlers, DDC building control systems, control system components, and stand-alone cooling equipment/systems—all of which are at or nearing end-of-life. Building air handling units would be served by new campus heating hot water and chilled water distribution piping loops, connected to a new central air-to-water heat pump plant at the CUP.

The Central Utility Plant (CUP) currently operates two 400 BHP natural-gas-fired boilers and one 150 BHP boiler, which together supply the campus heating-hot-water loop. This loop serves roughly 19 MMBtu/h of combined space-heating and domestic-hot-water demand.

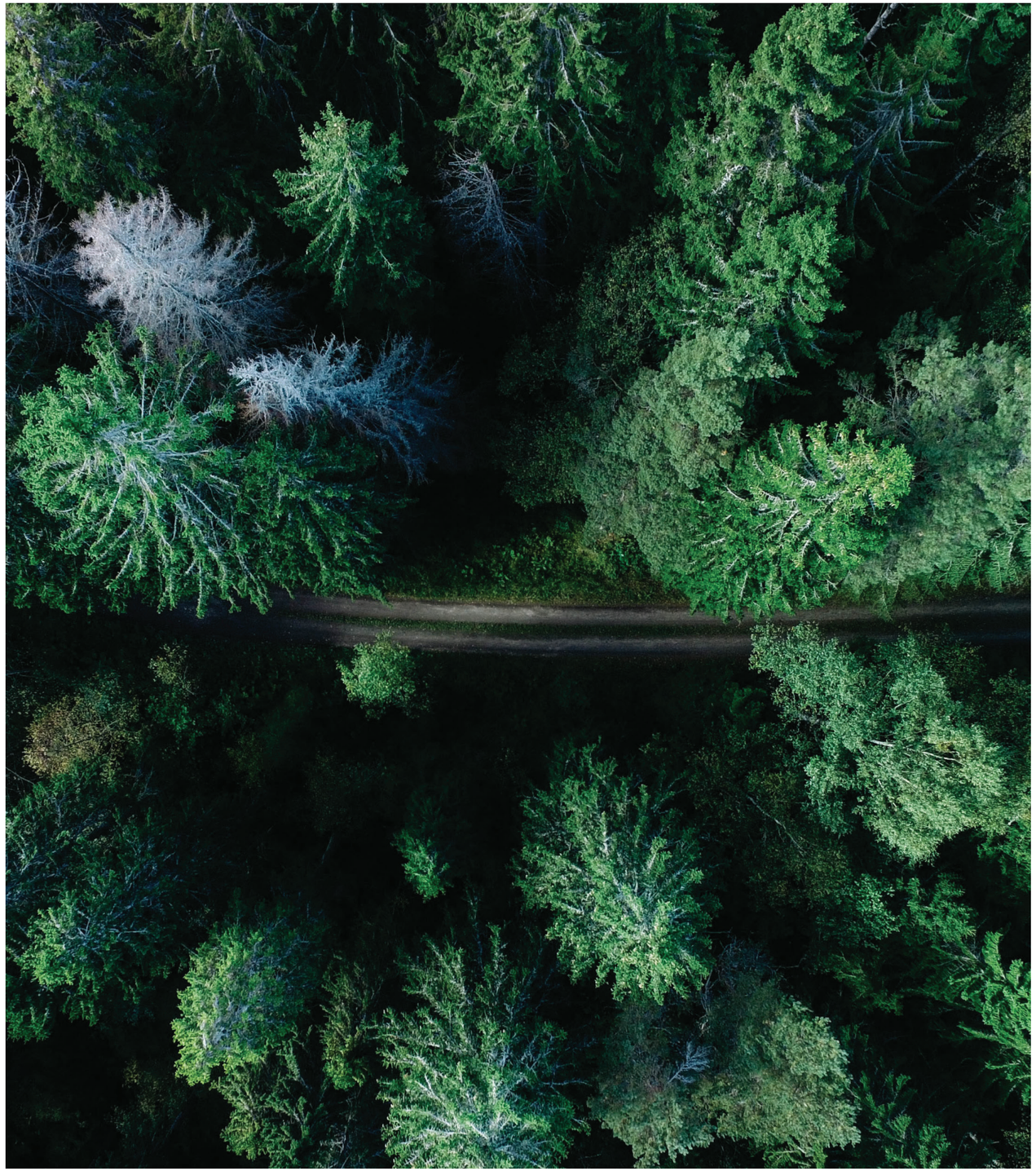
Campus cooling is delivered on a building-by-building basis through DX split systems or air-cooled chillers, providing nearly 8 MMBtu/h of capacity.

A campus-wide HVAC master plan applied a 50-year life-cycle cost analysis (LCCA) to several system options. The preferred approach pairs targeted energy-efficiency measures with a high-efficiency air-to-water heat-pump (AWHP) plant, lowering the campus energy-use intensity (EUI) from approximately 132 to 101 and shifting much of the demand from natural gas to electricity.

The 50-year LCCA projects HVAC costs for this option at just under $30 million. This figure excludes:

- Building-level HVAC upgrades required to connect to the new AWHP plant
- Electrical-infrastructure improvements for normal, emergency, and optional-standby power
- A new electrical service from Lewis County PUD

When these additional items are included and phased through sequential biennial funding requests over 14 – 16 years, the full decarbonization program could approach $100 million. Further study, design, capital-asset planning, state-funding approvals, and detailed construction estimates will refine these projections.



PROJECT TEAM

Washington State

Jacob Simmons	Dept. Children, Youth & Family Services, Project Manager
Lisa Horn	Dept. Enterprise Services, Project Manager

Hargis Engineers, Inc.

Ron Eliason	Mechanical, Principal
Robert Kuchcinski	Mechanical, Project Manager
Mike Baranick	Energy Services, Associate Principal
Akshita Mathur	Energy Services, ELCCA Analyst

WASHINGTON STATE DEPT. OF COMMERCE

CLEAN BUILDINGS PERFORMANCE STANDARD [CBPS, HB 1390]

Participating campus district energy systems must follow compliance rules for developing a decarbonization plan and meeting reporting requirements defined as:

> Decarbonization plans are mandatory for state campus district energy system… A state campus district energy system is a district energy system that provides heating, cooling, or heating and cooling to a campus through a distributed system providing steam, hot water, or cool water to five (5) or more buildings with more than 100,000 square feet of combined conditioned space, where the system and all buildings connected to the system are owned by the state of Washington.

INTRODUCTION

The Green Hill School Campus (GHSC) meets the criteria for a State Campus District Energy System.

01 **A district energy system that provides heating, cooling, or heating and cooling to a campus through a distributed system providing steam, hot water, or cool water.**

The Green Hill School (GHS) Campus is currently served by a distributed energy system. The Central Utility Plant (Building Z) houses natural gas-fired boilers that serve a campus-wide heating hot water distribution loop. This loop provides hot water to heat coils in air handlers, terminal units, unit heaters, fins to radiators, and double-wall heat exchangers located in each building, which in turn supply domestic hot water.

Currently, the district energy system provides heating only. As part of the GHSC HVAC Upgrades project—currently in design—centralized cooling will be added at the Central Plant to replace the stand-alone cooling systems presently used in most campus buildings.

02 **Five (5) or more buildings on the campus with more than 100,000 square feet of combined conditioned space**.

GHSC consists of 17 buildings, 15 of which are served by the CUP Heating Hot Water boilers. The total of all building conditioned space served is 266,671 square feet. GHSC consists solely of Tier 2 buildings as no individual building exceeds 50,000 sf.

03 **The system and all buildings connected to the system are owned by the state of Washington.**

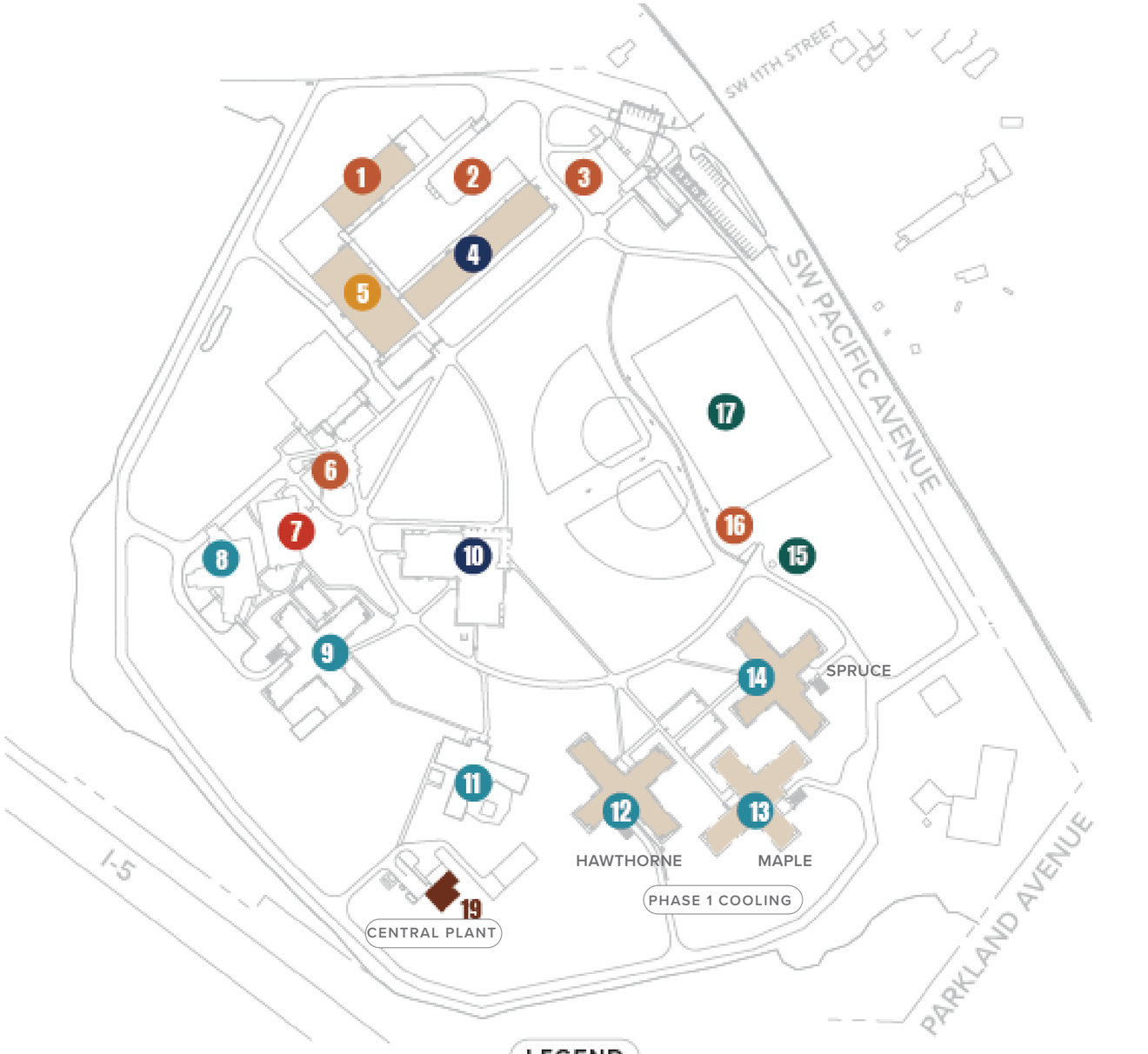
GHSC is owned by the Washington State Department of Children Youth and Families (DCYF). It is operated by the Washington State Department of Corrections (DOC).

GREEN HILL SCHOOL PROFILE

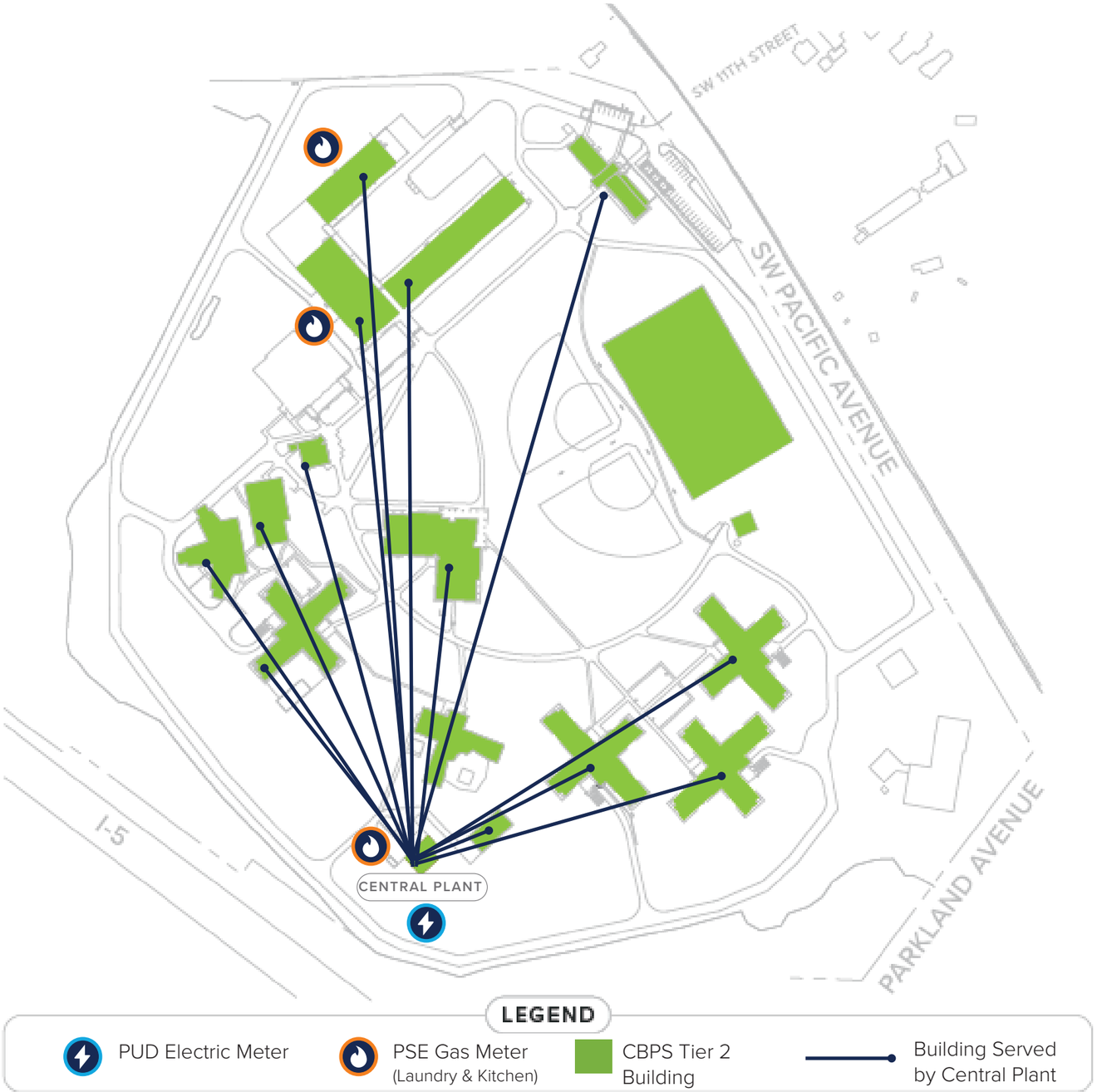
Opened in 1891 as the Washington State Reform School, the Chehalis campus now called Green Hill School (GHS) has mirrored every shift in the state's juvenile-justice philosophy—from the early farm-and-trade model, to its 1907 renaming as the Washington State Training School, to its build-out as a fenced maximum-security institution for offender-level boys under the Department of Social and Health Services. When House Bill 1661 created the Department of Children, Youth, and Families in 2017, lawmakers folded juvenile rehabilitation into that new, prevention-oriented agency; Green Hill formally transferred on 1 July 2019. DCYF has since repurposed the 34-acre site as its flagship treatment hub, integrating mental-health, education, and "JR-to-25" young-adult programs and even—amid recent overcrowding—temporarily moving older residents to adult custody while it builds new capacity. Thus, what began as a 19th-century reform school now anchors a 21st-century, child-focused continuum of care.

Green Hill School Campus (GHSC) has a Central Utility Plant (Building X) which contains natural gas fired boilers serving a campus heating hot water piping distribution loop for hot water heating coils in air handling units (AHU), terminal reheat units, unit heaters, and finned-tube radiators. This heating hot water loop also serves double wall heat exchangers in each building to meet the demand for domestic hot water.

At this time, only heating is centrally provided by the district energy system. In the future, as part of the design of the GHS Campus HVAC Upgrades project, currently in progress, centralized cooling will be provided at the Central Plant, to replace stand-alone cooling systems currently provided at most buildings on campus.



1	LAUNDRY (1998)	7	HEALTHCARE/ ADMIN (2009)	13	MAPLE (1998)
2	WASTE MANAGEMENT FACILITY	8	WILLOW (2009)	14	SPRUCE (1998)
3	ADMIN/ ENTRY/ VISITOR/SECURITY (1998)	9	BAKER (1998, 2017/2023 remodel)	15	SWEAT LODGE
4	VOCATIONAL (1998)	10	EDUCATION (1981)	16	BATHROOM / SHED (1998)
5	DINING (1998)	11	CYPRESS (2012)	17	REC (2022)
6	MULTIPURPOSE (1998)	12	HAWTHORNE (1998)	18	CENTRAL PLANT (1981)



COMPLIANCE SCHEDULE & PATHWAY

Schedule

In compliance with mandatory requirements for a campus decarbonization plan, Green Hill School registered its campus buildings and completed the District Energy System Registration and Opt-In Form on June 2, 2025. The Decarbonization Plan Reporting Form K is submitted in Appendix A.

DCYF has followed the CBPS Tier 2 compliance schedule for the decarbonization of the campus. The agency's actions are based upon the largest building being 36,811 square feet; and the Washington State Department of Commerce guidance on Decarbonization of District Energy Systems.

CBPS DECARBONIZATION PLAN COMPLIANCE SCHEDULE

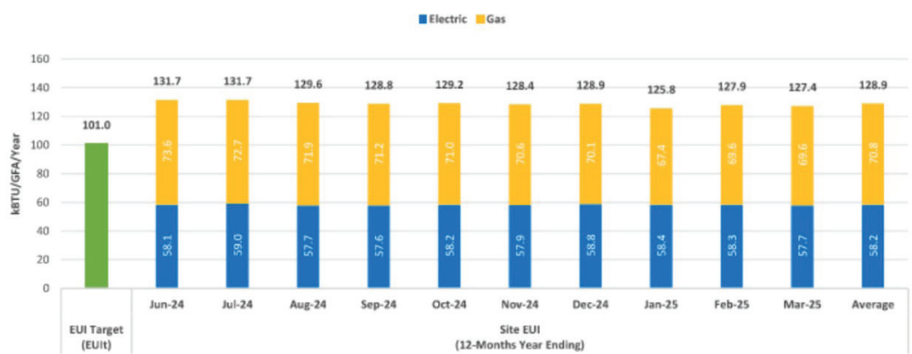
JUNE 30, 2025	SUBMIT DECARBONIZATION PLAN
JUNE 01, 2027	SUBMIT PLANS ENERGY MANAGEMENT OPERATIONS & MAINTENANCE
JUNE 30, 2030	SUBMIT DECARBONIZATION PROGRESS REPORT
	REPEAT EVERY 5 YEARS
JUNE 01, 2041	DECARBONIZATION PLAN FULLY IMPLEMENTED

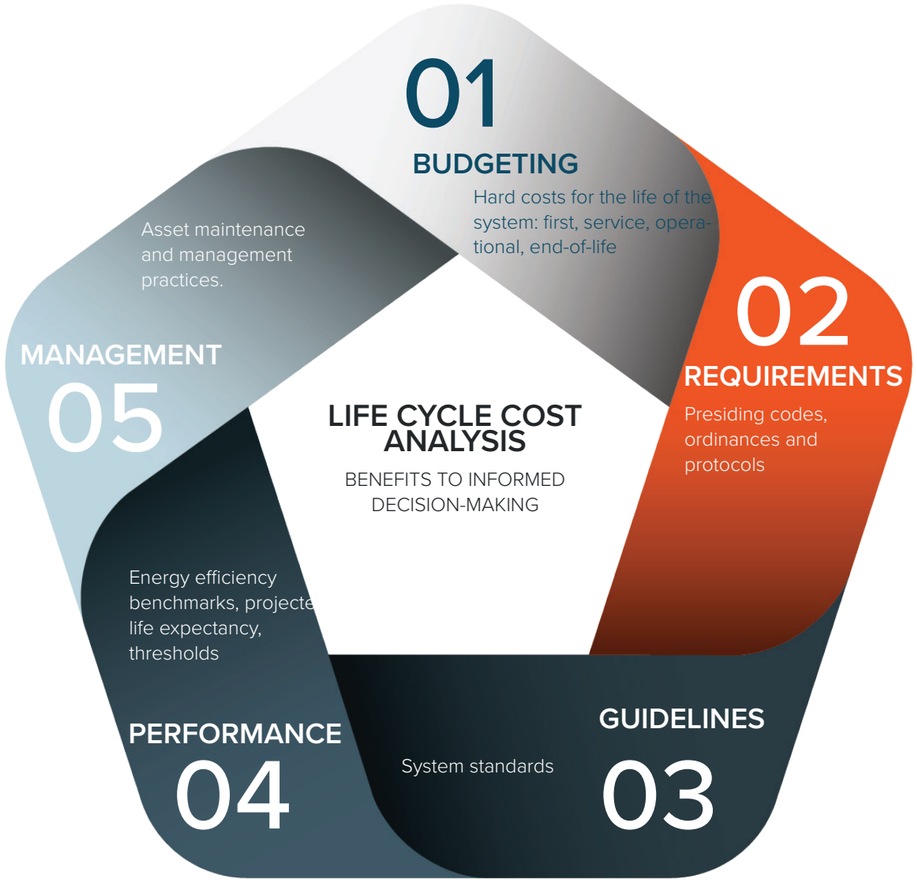
Upon completion of the decarbonization plan, the Green Hill School Campus plans to comply with the CBPS using the Energy Use Intensity Target (EUI_t) pathway (Appendix B).

Establishing Pathway: Benchmarking

- Energy benchmarking was performed to evaluate the historical operating performance as compared to the Energy Use Intensity Target (EUI_t).
- Historical utility bills were collected from Puget Sound Energy (gas) and Lewis County PUD (electricity). The campus contains (3) gas meters and (1) electric meter.
- The EUI target was calculated at 101 kBTU/SF/Yr using the "prison/Incarceration" space use type for all buildings.

The analysis revealed that historical operating EUI exceeds the target by 25-30%. Recommended action items include setup of an Energy Star Portfolio Manager (ESPM) account, decarbonization of the central plant for future EUI_t compliance, and development of energy management and operations and maintenance plans.





METHODOLOGY

In 2024, DCYF engaged Hargis Engineers to initiate the first phase of campus decarbonization efforts under Project 2025-085: Campus HVAC Improvements. As part of this effort, the team identified preliminary steps for developing the Green Hill School Campus (GHSC) District Energy Decarbonization Plan.

An HVAC condition assessment was conducted for the initial three residential housing buildings (H, M, and S) and the Central Utility Plant (CUP). A 2018 HVAC system condition report by another consulting engineering firm informed the 2025 study. That earlier report identified failing equipment, end-of-life conditions, and failed control components, which prompted immediate repair and replacement recommendations. Consequently, the study scope expanded beyond the originally budgeted three buildings, with the potential for additional supplemental funding in future state biennium cycles.

A review of domestic water heating options was also conducted; however, due to budget limitations, domestic hot water scope was excluded from the study. With additional funding, it is part of the expanded campus domestic hot water study.

ELCCA Scope

As part of the HVAC Improvement project, an Energy Life Cycle Cost Analysis (ELCCA) work plan was developed and submitted. (Appendix C).

The ELCCA was conducted for the first three residential housing buildings (H, M, and S). While a range of energy efficiency measures was initially considered—including HVAC, plumbing, and controls—budget constraints limited the scope to HVAC and controls system upgrade measures only. These upgrades explored both local improvements and options for centralized HVAC utility services.

ELCCA Components

Energy modeling of building envelopes for insulation, wall, and window types installed under the code in effect at the time of construction.

Energy modeling of Building Mechanical systems (Air Handling Units [AHUs], Stand-alone DX Condensing Units serving AHU Cooling Coils, Terminal Units, Unit Heaters, Radiant Heaters, Exhaust Fans, Pumps, Fans, Controls)

Preparation of cost opinions to recondition or replace 3 different HVAC System/Equipment options.

Evaluation of Maintenance and Operations tasks/costs for each system/equipment option over the 50-year life of each measure

Evaluation of replacement costs for systems/equipment over the 50-year life of each measure.

ELCCA EVALUATION

Three system types were considered for the initial 3 Housing Buildings:

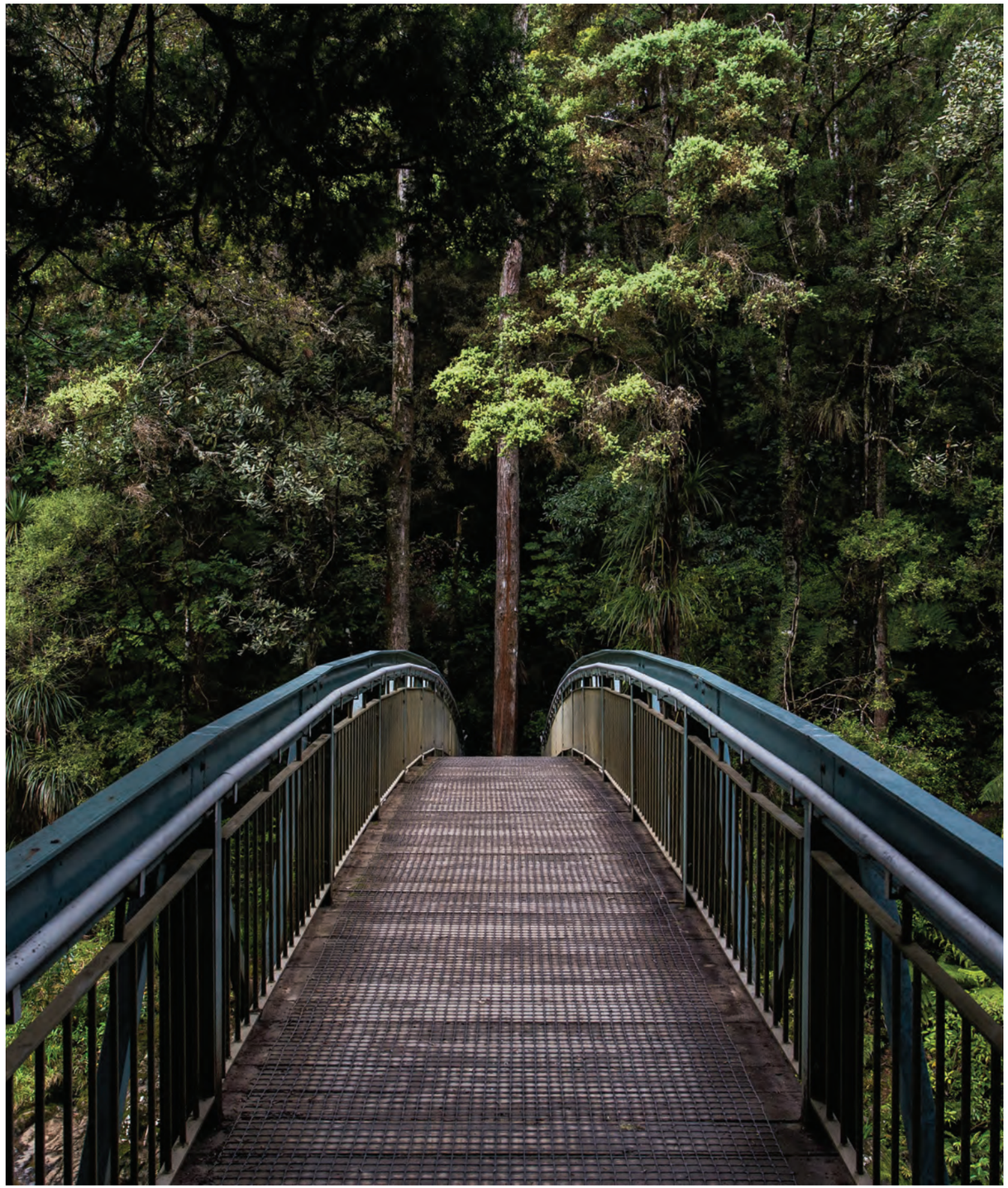
01 **Distributed DX Heat Pump Coils with dedicated outdoor Condensing units** - This is the current type of system in use, at the end of it's useful life. It is a large version of the Air to Air Heat Pump Split system type often used for cooling indoor IT closets, rejecting energy collected indoors to an outdoor Condensing unit by circulating Refrigerant through coils and condensing Refrigerant gas in to liquid via compressors. This system type has the lowest anticipated life expectancy, so requires more replacements over the 50-year ELCCA timeframe, driving a higher life cycle cost for this option.

02 **Distributed Air to Water Heat Pump (AWHP) Heating and Cooling** - Same as above, except the bank of AWHPs provided is only what is needed for the capacity of an individual building. this means one additional unit is needed at each building to preserve N+1 redundancy and code-required backup capacity. This has the drawback of having multiple locations for maintenance.

03 **Centralized Air to Water Heat Pump (AWHP) Heating and Cooling** - A bank of AWHP modules located centrally near the existing CUP building generate Chilled Water (CHW), and Heating Hot Water (HHW). CHW and HHW is then distributed to CHW and HHW coils in Air Handlers in campus buildings via supply and return piping loops. This limits Electrical Infrastructure upgrades to primarily in and around the CUP building where the existing Electrical Service Entrance for the campus, and the Emergency and Optional Standby Power Generator and related Infrastructure are located. Centralizing the AWHP equipment results in fewer pieces of redundant equipment being needed, lowering overall project costs.

For all 3 ELCCA options above, an Option "A" With Natural Gas Boiler backup, and Option "B" Electric Boiler heating backup was considered.

For all 3 ELCCA options above, it is assumed that the end-of-life Building DDC Systems and related components would be replaced both at the CUP, and at each building.



RECOMMENDED APPROACH

Proposed Solution

DCYF chose Option 3A (Centralized Air to Water Heat Pump Heating and Cooling, with gas backup), which had the second lowest ELCCA cost. Primary factors for choosing this option include:

- A cohesive campus-wide approach to replacing aging HVAC systems and Building Controls systems
- Significant energy use reductions
- Significantly improved comfort and controls
- Centralization of maintenance, reduced maintenance costs and hassle
- Helps GHS Campus take steps towards electrification and reducing natural gas use
- Centralization of utility energy/power upgrades required. The increase in electricity demand due to electrification would require doubling the Diesel Generator Optional Standby power capacity, and also require a new Lewis County PUD Electrical Service.

This distributed approach provides a cohesive, campus-wide solution to modernize aging HVAC and controls infrastructure. It delivers substantial energy savings, improves occupant comfort, and supports centralized maintenance—reducing both costs and operational complexity. The system advances the agency's decarbonization goals by decreasing reliance on natural gas and aligns with long-term infrastructure planning. Execution of these goals requires a transition away from a legacy natural gas heating system and will require expanded normal and optional standby power capacity, as well a new PUD Electrical service to meet the increased electricity use.

Honoring Prior Investments

The Green Hill School Campus relies on a legacy natural-gas boiler plant that has recently received major upgrades, including fire-tube replacements, refractory repairs, variable-frequency combustion blowers, and new pumps and controls. In addition, natural gas still delivers heat at a substantially lower cost per unit of energy than electricity.

Decades of capital investment give the plant significant embodied value, and keeping it online preserves critical standby capacity for extreme cold snaps or utility outages. Accordingly, Green Hill will retain the natural-gas boilers as backup while a new electric air-to-water heat-pump (AWHP) system assumes the primary heating and cooling load through phased HVAC upgrades across the campus, with the eventual goal of deriving less than 10% of it's annual heating capacity from natural gas.

CONSIDERATIONS

CO_2 Heat Pumps

Additional consideration has been given to equipment manufacturers utilizing a different refrigerant type (CO_2) for the Central Plant Heating and Cooling AWHP equipment, as opposed to R-32 or R-454B. While CO_2 has been in use at scale in Industrial applications, it is new to Commercial Building Construction. Utilizing CO_2 as the refrigerant and provides the following benefits:

01 Higher Heating Water (HHW) temperature (180°F, versus 120-140°F, higher water temperatures in heating hot water provides increased energy transfer capability at), at building heating hot water coils in air handlers, and at double wall heat exchangers generating domestic hot water from 40°F domestic cold water).

02 The higher HHW also has the following benefits:

- i Existing building hot water heating coils do not have to be replaced immediately with larger heating coilswhen the CUP heating method is changed from Natural Gas to AWHP.
- ii Existing DHW Heaters also do not have to be replaced immediately, for the same reason
- iii A separate campus wide domestic hot water loop served by separate domestic hot water heater heat pumps (also a type of AWHP) is not longer needed.

03 The CO_2 AWHP array is able to recover “waste” energy that is removed from building air when it is cooled in AHUs during the cooling season and redirect this energy to preheat Domestic Hot Water. This reduces the amount of energy that must be generated by AWHP compressors or natural gas boilers for DHW heating.

The high temperature LWT from the CO_2 AWHP equipment leads to reduced project construction costs, future reductions in maintenance and energy use costs, and allows the centralized Natural Gas boiler infrastructure to continue to serve as a backup heating source for the campus.

CONSIDERATIONS [CONTINUED]

Full Electrification

As each design and construction phase receives state funding, additional air-to-water heat-pump (AWHP) modules will be installed at the Central Utility Plant, steadily reducing the campus's reliance on natural-gas boilers.

Initially, a portion of the heating load can migrate to AWHPs without upgrading the normal or emergency power systems. This flexibility comes from retiring building-specific DX cooling units as projects are approved. Over time, however, full electrification will require major improvements to the campus electrical infrastructure—work that calls for detailed planning, engineering, and further capital investment from the State of Washington.

A complete transition to electric heating and cooling will require the campus to replace or augment its standby generators, diesel-fuel storage, and normal/emergency switchgear—at least doubling present electrical capacity—and to secure a new utility service from Lewis County PUD.

Achieving these upgrades will demand sustained coordination and investment:

Long Range Capital Planning — campus master planning, scope development, phasing planning, capital budget requests and approvals for multi-million dollar budgets over multiple state budget biennia timeframes

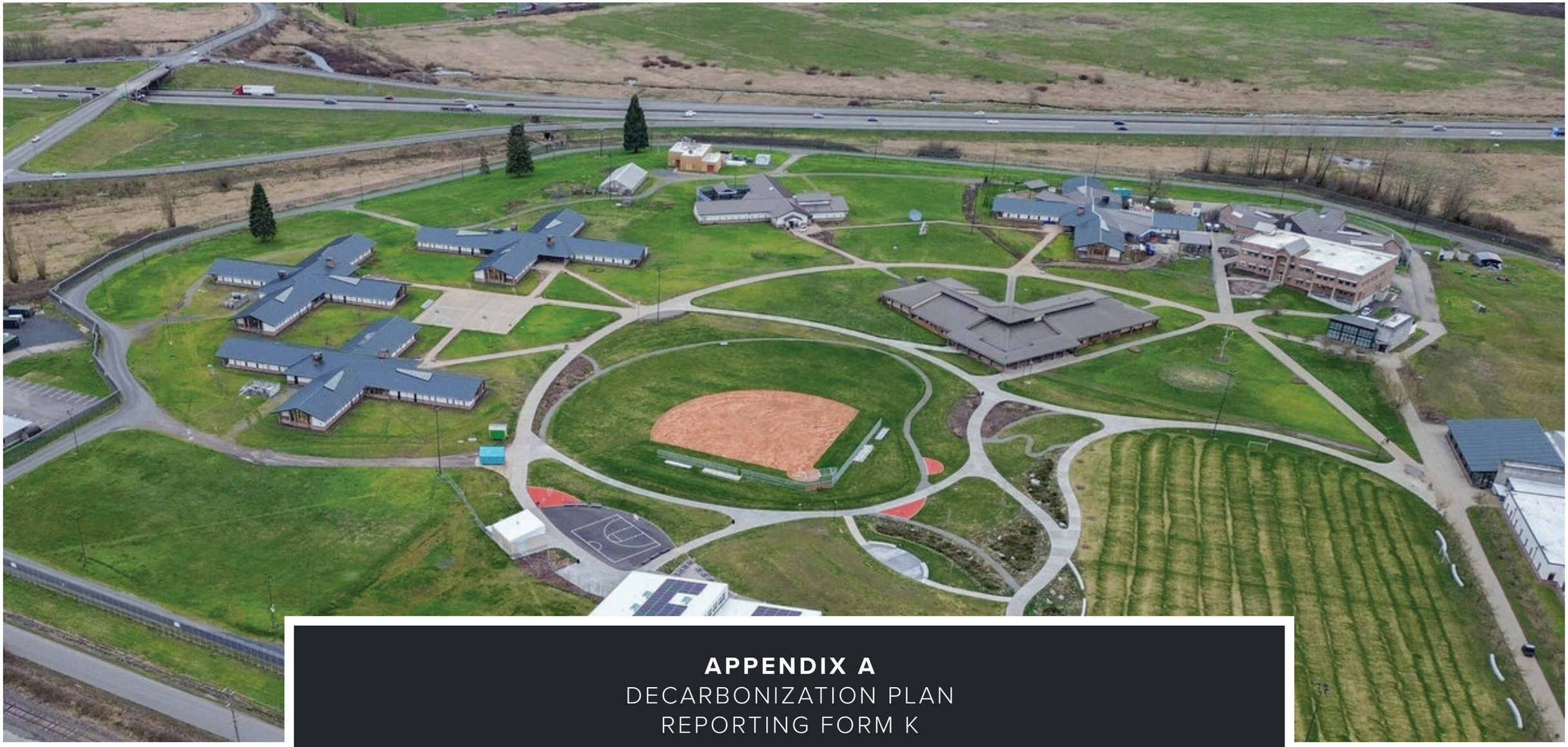
Close collaboration with Lewis County PUD — to add generation and transmission capacity and integrate new lines into the GHS campus

Early procurement of long-lead equipment — diesel generators, fuel tanks, switchgear—that can take up to two years to secure

Major occupancy/programming interruptions — Multiple phases of planned power outages, HVAC system/equipment replacements, piping, ductwork, power, and controls cutovers, startup testing, and commissioning

DCYF, the State of Washington, and ultimately taxpayers will shoulder the cost of generation and transmission. Robust planning, funding, design, and construction resources are therefore critical to reach full campus electrification.

The reference materials attached in the following appendices provide clarity on the scope and scale of work involved with the Decarbonization Green Hill School Campus.



APPENDIX A

DECARBONIZATION PLAN
REPORTING FORM K

Washington State Department of Commerce

CLEAN BUILDINGS PERFORMANCE STANDARD

Form K – Decarbonization Plan Reporting

District Energy System Decarbonization Plan Content Outline

Date: 6/30/2025

Decarbonization plan submittal ☑
Progress reporting ☐
Completion reporting ☐

Overview:

The owner of a participating campus must develop a district energy system (DES) decarbonization plan to provide a strategy for up to 15 years and submit it to Commerce, the Authority Having Jurisdiction (AHJ). The AHJ may approve a decarbonization plan that is based on an implementation schedule longer than 15 years. A participating campus with a district energy system providing cooling only, which does not decarbonize their heating system, is allowed 5 years. Reference RCW19.27A.260 and the Clean Buildings Performance Standard, Normative Annex W for more details.

Form K is a content outline checklist:

The Form K will act as an index to both help ensure your organization's decarbonization plan document includes all required information as referenced within Normative Annex W of the Clean Building Performance Standard (CBPS) integrated document, and to facilitate locating the information.

Instructions:

1. Complete this Form K:
   As you work through Form K, use the second column labeled "**Reference Decarb Plan Location**" to identify where in the actual Decarbonization Plan, your organization addresses the specific requirement. This may be a page number, section title, table, or exhibit. Use the third column labeled "**Notes**" within this Form K to provide any notes pertinent to the specific requirement.

2. Attach completed Form K in the Clean Buildings Portal:
   When ready to submit, attach the completed Form K and the final Decarbonization Plan with the campus or state campus district energy system application in the Clean Buildings Portal (Portal).

3. Request Shared Access for Portal Access:
   If an authorized representative requires Portal access, please complete the **Shared Access Request Form** and submit documentation confirming you're an authorized representative. Commerce will grant shared access.

Participating Campus Summary			
Campus Group ID:	Campus Name: Green Hill School	☑ State Campus District Energy System (mandatory) ☐ Campus District Energy System (voluntary)	
Owner Name: Jacob Simmons	Owner Email: jacob.simmons@dcyf.wa.gov	Contact Name: Mike Baranick	Contact Email: michael.baranick@hargis.biz

Campus Group ID: _____ Campus Name: Green Hill School

Participating Campus – Building List			
All existing buildings connected to district energy system:		☐ Listed here ☐ Listed in Excel spreadsheet (attached) ☑ Listed in Decarb Plan:	
Building ID:	Building Name:	Building Addresses:	GFAs:

Notes:

Buildings #16 and 17 in the attached list (Recreation Field Storage/bathrooms, Recreation Building, respectively), are stand-alone buildings and are not served by the Central Utility Plant, or the related District Utility heating and cooling services.

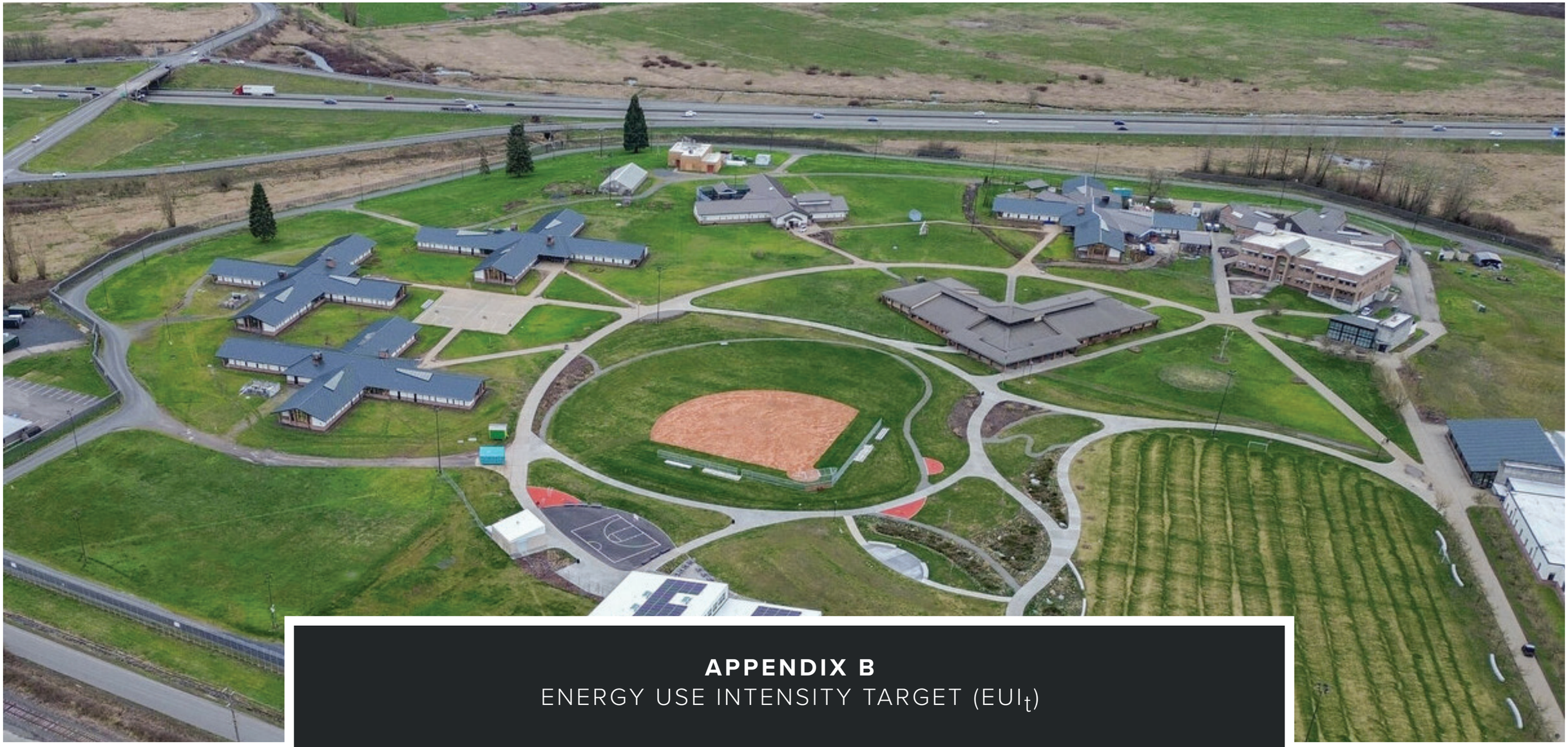
Campus Group ID: _____ Campus Name: Green Hill School

W6.8–2 Decarbonization Project Scope of Work	Reference Decarb Plan Location	Notes
Existing District Energy System and Campus W6.8-2a Summary of existing district energy system and campus layout including		
List of all buildings served by the district energy system:	Appendix B	Buildings 1 to 15
List of all buildings served by the district energy system heating and/or cooling plant, peak load:	Campus:19,100 Mbh Heating	Heating includes DHW loads. See attached summary for individual building heating loads.
Description of current district energy system, including but not limited to: heating and cooling system type(s), configuration(s), output capacity(ies), thermal distribution loop(s):	Centrally located Natural Gas fired hot water heating boilers feeding a campus HHW distribution piping loop, and Hot water Converters for DHW at each Building. Future Air to Water Heat Pumps providing heating hot water will also have the capability of providing chilled water.	None of the buildings on campus is served from a central cooling system. The Education building is the only building on campus that does not have building-wide cooling.
Energy Monitoring (Benchmarking) Identification of **current** benchmarking configuration:	Y N Campus DES: ☑ ☐ Connected building: ☐ ☐ Campus-level: ☑ ☐	An existing DDC system monitors several of the buildings, but with multiple DDC system brands, much of the equipment old, or non-monitored panels/equipment, the existing DDC system does not provide consistent campus-wide energy monitoring.
Energy use intensity target (EUI_t) (kBtu/ft2/yr): based on completed Section Z6.2 ***Form B Note:*** *Baseline WNEUI for decarbonization plans that will meet investment criteria through conditional compliance*	101.0, Appendix B	
Measured site EUI (kBtu/ft2): for the identified benchmarking configuration at time of decarbonization plan submittal based on Section Z6.3 Form C	127.4, Based on Utility meter data for Electricity (March 2023 to March 2025) and Gas (August 2023 to April 2025)	Based on installed equipment and building envelope, load calculations and energy modeling forecast a comparable EUI of ~132.
Proposed District Energy System and Campus W6.8-2b Proposed decarbonized district energy system and campus layout including		
List of all buildings served by the district energy system:	Appendix B	Buildings 1 to 15
List of all buildings served by the district energy system heating plant, peak load:	10,570 Mbh Heating, campus-wide, with DHW	Loads noted are anticipated loads, PRIOR to Demolition and Replacement of Education building and related heating systems, and assume DHW storage will be implemented on a building by building basis.
List of all buildings served by the district energy system cooling plant, peak load:	7,620 Mbh Cooling, campus-wide	Loads noted are anticipated loads, PRIOR to Demolition and Replacement of Education building, which will add new cooling.
Description of proposed district energy system, including but not limited to: heating and cooling system type(s), configuration(s), output capacity(ies), thermal distribution loop(s):	The campus heating hot water piping loop is at the end of it's useful life, will be replaced. A central plant fed chilled water loop will be installed at the same time the HHW loop is replaced. Central Air to Water Heat pumps located at the CUP will provide HHW and CHW utilizing either R-454B, or CO2 as the Refrigerant. DHW is anticipated to be generated at each building via HHW service of double wall HXs.	Existing Natural Gas boilers will remain and be connected via heat exchanger to the HHW loop. This will allow Natural Gas boilers to serve as the redundant/backup heating source, for extreme cold/high heating load conditions, anticipated to be less than 10% of annual operating hours.
• An inventory and evaluation of possible options to partner with nearby sources and uses of waste heat and cooling:	None planned.	The Recreation building has a stand-alone dedicated Ground Source Water to Water Geothermal "Slinky coil" heating/cooling system loop.
• An inventory and evaluation of expanding district energy system to other buildings:	None planned.	
Identification of heating plant backup type, fuel source, capacity:	Existing backup heating source is centrally located Natural Gas fired Heating Hot Water Boilers, in compliance with CBPS.	

Campus Group ID: _____	Campus Name: Green Hill School	
Identification of proposed energy efficiency measures (EEMs) required to meet the requirements of the standard:		
Proposed building performance metric (W6.8-2c)		
Compliance Pathway • If EUI_t - Form D is NOT required & Form F is NOT required unless, *decommissioning in accordance with Section W3.1.1 Exception 2* • If Investment Criteria - Form D & Form F are required	Y N EUI_t: ☐ ☑ Investment Criteria: ☐ ☑	
Energy Monitoring (Benchmarking) Identification of **proposed** benchmarking configuration:	Y N Campus DES : ☑ ☐ Connected building: ☐ ☐ Campus-level: ☑ ☐	
Proposed energy use intensity target (EUI_t) (kBtu/ft2/yr): developed in accordance with the standard	101.0	
Projected site EUI (kBtu/ft2): for the identified benchmarking configuration after implementation of decarbonization plan based on Section Z6.3 Form C	101.0	Energy Services can provide
Only required if using Investment Criteria **Form D – Energy Audit:** documenting proposed energy efficiency measures (EEMs). If not yet complete, Plans for Level 2 energy audit, on Tier 1 covered buildings.	N/A	
Only required if using Investment Criteria, or EUI_t when complying through decommissioning in accordance with Section W.3.1.1 Exception 2 **Form F – Life Cycle Cost Analysis:** documenting the LCCA if pursuing the investment criteria of the standard. If not yet complete, Plans for Life Cycle Cost Analysis (LCCA).	N/A	
Proposed metering configuration (W6.8-2d)		
Metering measures district energy system heating and/or cooling plant input to individual buildings:	Y N ☑ ☐	
Metering is configured in a manner to measure proposed benchmarking configuration:	Y N ☑ ☐	
Metering includes independent end use metering of district energy system backup heating plant:	Y N ☐ ☐	TBD...

Campus Group ID: _____	Campus Name: Green Hill School	
W6.8–3 Recommended district energy system decarbonization plan considerations	**Reference Decarb Plan Location** Enter "NA" if not applicable	**Notes**
Participating campuses are encouraged to include the following considerations in a decarbonization plan:		
Distribution network upgrades:		TBD
On-site energy storage facilities:		TBD
Space cooling for residential facilities:		TBD
Labor and workforce, including state registered apprenticeship utilization:		TBD
Options for public-private partnerships:		TBD
Incorporation of industrial symbiosis projects or networks as described in chapter 308, Laws of 2021.		TBD
W6.8–4 Utility engagement	**Reference Decarb Plan Location** Enter "NA" if not applicable	**Notes**
Narrative of steps taken including the date range of communications, for participating campuses consultation with the electric utility and the natural gas utility serving the site of the system during decarbonization plan development:	N/A	Developing a new additional Electrical Utility service requires authorization of campus-wide design and construction scope by the State of Washington
W6.8–5 Proposed Project Timeline	**Reference Decarb Plan Location** Enter "NA" if not applicable	**Notes**
Provide Implementation Details and Dates:		
Energy Management Plan (EMP): implemented in accordance with Section W3.1.1(5)	N/A	TBD
Operations and Maintenance (O&M) program: implemented in accordance with Section W3.1.1(5)	N/A	TBD
Energy efficiency measures (EEMs) required to meet the standard:	See Decarbonization Plan	
All phases of district energy system decarbonization plan • Decarbonization plan shall determine implementation schedule, project timeline, compliance schedule	NOT FEASIBLE. DEPENDENT ENTIRELY ON FUNDING BY WASHINGTON STATE OF MULTIPLE PHASES OF DESIGN, CONSTRUCTION, AND OPERATIONS OF EEMS, EMP, O&M PROGRAM, AS WELL AS ADDITION OF NEW ELECTRICAL UTILITY SERVICE TO SITE, DOUBLING OF EMERGENCY DIESEL FUEL GENERATOR AND DIESEL FUEL STORAGE CAPCITY	

Campus Group ID: _____	Campus Name: Green Hill School	
W6.8–6 Other Considerations	**Reference Decarb Plan Location** Enter "NA" if not applicable	**Notes**
Communication engagement (occupants, utilities, funders, public…):		TBD
Are funding mechanisms in place?	**Y** ☐ **N** ☑	
Are there Cost projections in place?	**Y** ☐ **N** ☑	
• What are your current/updated estimated costs?	N/A	
• What are your current expended costs?	N/A	
Changes to decarbonization plan required to meet changes in codes, laws and standards including any future reductions in EUI_t:	N/A	



APPENDIX B

ENERGY USE INTENSITY TARGET (EUI_t)

Washington State Department of CHILDREN, YOUTH & FAMILIES

Green Hill School

Building Identification:

Address:	375 SW 11th St Chehalis, WA 98532
ESPM #	TBD
CBPS #	TBD

Compliance Outlook:

Compliance	**Does NOT Comply with EUI Target Path**
Margin	25% - 30% above EUI Target
Recommendation(s)	1) Campus contains a district energy system; submit a Decarbonization Plan to Commerce by June 30, 2025. 2) Setup building within Energy Star Portfolio Manager (ESPM). 3) Perform an energy audit to identify low-cost EEMs that can be implemented to reduce EUI. 4) Ensure Operations and Maintenance Plan is developed and implemented 12 months before compliance deadline. 5) Ensure Energy Management Plan is developed and implemented 12 months before compliance deadline.

Compliance Deadline:

>220,000 GFA	June 2026
>90,000 GFA	June 2027
>50,000 GFA	June 2028
>20,000 GFA	June 2032

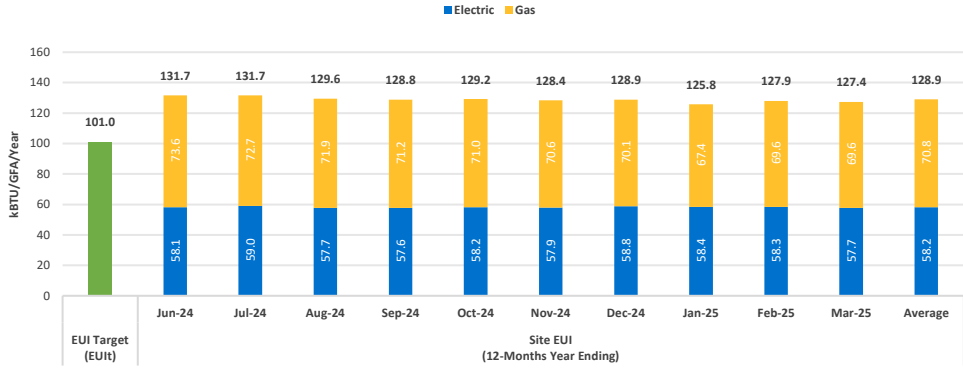
Note: EUI performance period not to exceed two years prior to compliance deadline. Early compliance is available for Tier 1 buildings for the first compliance cycle, utilizing data within two years of compliance documentation submission.

Energy Use Intensity Target (EUI_t) Calculation :

Climate Zone 4C
New Building* N *permitted after June 30th, 2016

Area #	Area Description	Gross Floor Area (GFA)	Weekly Operating Hours	Portfolio Manager Types	Portfolio Manager Sub-Types	Sub-Types: Detailed	EUI_t	Operating Shift Normalization Factor	Adjusted EUI_t
1	Administration	8,906	168	Lodging/residential	Prison/Incarceration		101	1	101.0
2	Vocational	36,811	168	Lodging/residential	Prison/Incarceration		101	1	101.0
3	Laundry / Shop	13,686	168	Lodging/residential	Prison/Incarceration		101	1	101.0
4	Dining	27,402	168	Lodging/residential	Prison/Incarceration		101	1	101.0
5	Multipurpose/Chapel	2,122	168	Lodging/residential	Prison/Incarceration		101	1	101.0
6	Health Center Administration	22,407	168	Lodging/residential	Prison/Incarceration		101	1	101.0
7	Willow Living Unit	10,923	168	Lodging/residential	Prison/Incarceration		101	1	101.0
8	Education	22,556	168	Lodging/residential	Prison/Incarceration		101	1	101.0
9	Baker Living Unit	17,552	168	Lodging/residential	Prison/Incarceration		101	1	101.0
10	Cypress Living Unit	18,110	168	Lodging/residential	Prison/Incarceration		101	1	101.0
11	Central Plant	4,544	168	Lodging/residential	Prison/Incarceration		101	1	101.0
12	Greenhouse	4,000	168	Lodging/residential	Prison/Incarceration		101	1	101.0
13	Hawthorne Living Unit	17,751	168	Lodging/residential	Prison/Incarceration		101	1	101.0
14	Maple Living Unit	17,751	168	Lodging/residential	Prison/Incarceration		101	1	101.0
15	Spruce Living Unit	17,751	168	Lodging/residential	Prison/Incarceration		101	1	101.0
16	Recreation-Field Storage/Restrooms	578	168	Lodging/residential	Prison/Incarceration		101	1	101.0
17	Recreation	27,496	168	Lodging/residential	Prison/Incarceration		101	1	101.0
		270,346					**Overall Area-Weighted EUI_t**		**101.0**

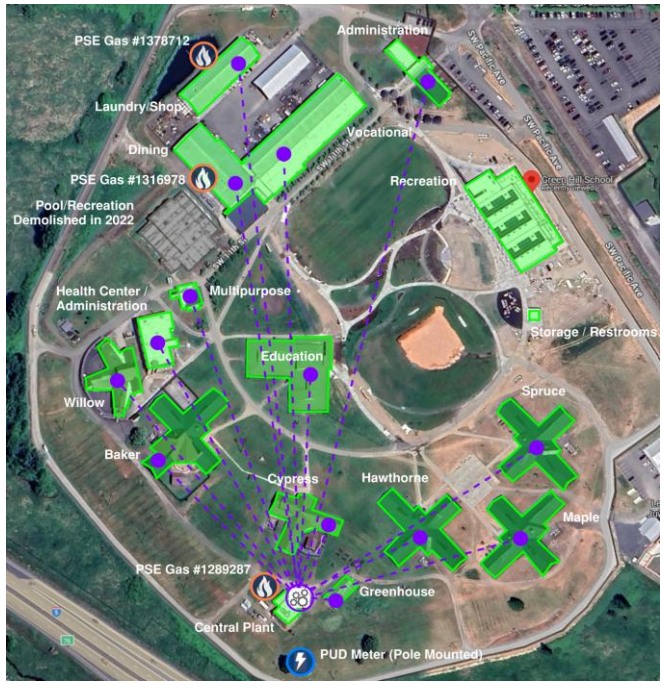
Historical EUI Comparison:

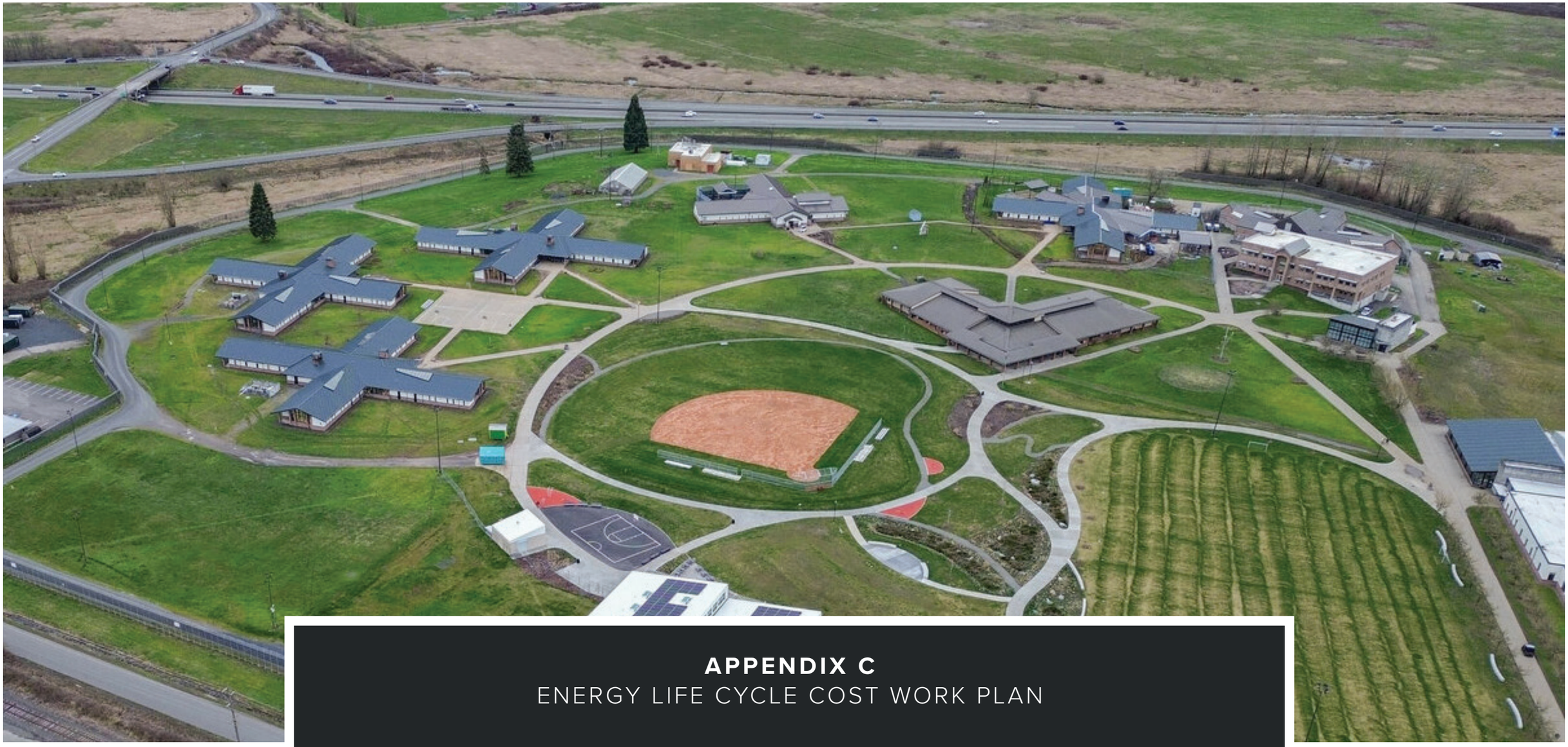


Comments:

1) Energy usage is not weather-normalized.

Site Map:





APPENDIX C

ENERGY LIFE CYCLE COST WORK PLAN

Washington State
DEPARTMENT OF
ENTERPRISE SERVICES

FIGURE 3.1 ELCCA WORK PLAN

Project Description

Project Title:	Green Hill School - HVAC Renovation a	**Date:**	2/27/25
Agency Name:	DCYF	**City:**	Chehalis
Gross Sq Ft New:	0	**Gross Sq Ft Remodel:**	50,000
Building Only Cost Estimate:	$3.8M	**Site Cost Estimate:**	Included in bldg cost
Function Areas:	Correctional Facility Living Units for minors		
Electric Utility:	Lewis County PUD	**Gas Utility:**	PSE
Design Phase:	Spring 2025	**Est. Bid Due:**	TBD
Energy Modeling Software:	IES-VE		
List organizational energy reduction goals and greenhouse gas emission goals and how the energy use of the building helps achieve these goals:	Mechanical system upgrades, compliance with CBPS, future decarbonization.		

Statement of Energy Design Intent

Energy Savings Goal over WSEC:	N/A - existing building
TARGET Energy Use Intensity (kBtu/ft^2/yr):	TBD (awaiting utility bills)

Team Members

Contact	Name	Organization	Email	Phone
Analyst	Mike Baranick	Hargis Engineers	michael.baranick@hargis.biz	206-436-0448
Owner's PM	Jacob Simmons	DCYF	jacob.simmons@dcyf.wa.gov	
Architect	N/A			
Other	Lisa Horn	DES PM	lisa.horn@des.wa.gov	360-742-6389

Building Envelope

Describe any high-performance envelope features that will be analyzed/evaluated to achieve stated energy savings goal and that go beyond the minimum code requirements:	
Existing facility - not in scope	
TARGET UA improvement over WSEC required:	

Air Leakage

Describe proposed design and construction strategies to ensure continuous air barrier:	
Existing facility - not in scope	
TARGET infiltration rate (cfm/ft^2 @ 0.3" wg (75 Pa)):	

Lighting Systems

Describe any lighting strategies that will be analyzed/evaluated to achieve stated energy savings goal and that go beyond the minimum code requirement:
Existing facility - not in scope

TARGET interior lighting energy intensity (W/ft^2):	

Mechanical Systems

Add baseline scenario (not part of ELCCA report):
Replace systems like for like: constant volume AHU, remote condensing units, heat from central plant?

request l efficienc

M1 – Baseline Code Compliant System Description:
Distributed Systems (VRV): - Replace existing constant volume AHUs (fans, coils, dampers, actuators, filters, etc.) at each building (4x per building). Include VFDs to convert units to single-zone variable air volume (SZ-VAV). - Replace DDC controls with new. - Replace split-system DX condensing units with VRV heat pumps with low-ambient kit for heating/cooling
M2 – Renewable Alternative1[1]:
Distributed Systems (heat recovery chillers): - Replace AHUs and controls (same as M1) - Demolish existing split-system DX condensing units. - Provide modular heat recovery chillers (N+1) at each building. Provide heating/chilled water piping to building. Provide buffer tanks and pumps. - Build shed at each building to house equipment.
M3 – All Electric Alternative:
Central System (heat recovery chillers): - Replace AHUs and controls (same as M1) - Demolish existing split-system DX condensing units. - Provide modular heat recovery chillers (N+1), located near central plant. Adding new buried heating water piping and add chilled water piping and route to each building. Provide buffer tanks and pumps. Equipment to be located within existing building.

2 chille

6 chillers

[1] Renewable is defined as utilizing renewable energy sources including, but not limited to, hydroelectric power, active or passive solar space heating or cooling, domestic solar water heating, windmills, waste heat, biomass and/or refuse-derived fuels, photovoltaic devices, and geothermal energy.

Other (Consider Net-Zero Energy Ready Alternative):

Note: This project will not study a "code-minimum" option. For reference, the code minimum system for this building is to continue reliance on the gas-fired boiler plant as the primary source of heating since the boiler plant is out of scope of this project (see C503.4.6, Exception #2). Also, The domestic water heating system is provided by the gas-fired boiler plant and is also out of scope of this project.

Submit completed Work Plan by email to elcca@des.wa.gov.

APPENDIX D
ALTERNATIVES ANALYSIS

Scope/Measure: ***Baseline***	**Existing- Split system DX cooling coils, HHW coils, 1 condenser per AHU,**

System/Scope Description:	• (4) 4,360 cfm single zone AHU's, min OSA is 3,075 cfm total
	• Heating via CUP heating hot water system loop
	  o 451 mbh connected load, 200F EWT, 22.6 gpm
	• Cooling is split DX with one condensing unit per AHU
	  o 454 total mbh (37.8 total tons)
	• (4) exhaust fans - 3,195 total cfm
	• (2) hw unit heaters
	• DHW generated via Double wall HX Convertor via campus HHW loop
	  o 1,050 mbh, 30 gpm
	• Delta ORCA DDC controls
	o Renovate AHUs- Replace Fans, Motors, Septum wall, Filter bank
	o Replace Condensing units, plan for DX coil replacement
	o Replace Controls Components, Valve/Damper Actuators, Sensors
	o Replace Direct-buried Site Piping
	o Replace aging central boilers with smaller modular condensing boilers
	o Replace DDC system

Benefits	• No rework of existing power • Low cost gas for heating • Minimal building/plant revisions
Drawbacks	• Distributed maintenance, more pieces of equipment • Aging natural gas fired boilers still serve HHW loops, DHW • Aging direct-buried piping, involves loss of HHW/DHW to replace piping • No redundancy in cooling • Does not move towards Clean Buildings transition from natural gas
Redundancy	• No redundancy on cooling • No redundancy in building equipment • Redundant Primary and Secondary HHW pumps at CUP
Power Requirement	Highest electrical power consumption per ton, for cooling Low electrical power consumption per Btuh, for heating
First Cost	
Operating Cost	• Lowest cost of heating due to natural gas, Highest cost of cooling • Highest cost of maintenance due to aging HHW piping loop, multiple condensers at multiple locations (each building)

Scope/Measure: ***M 1***	**VRV System- Heating & Cooling via a Single Refrigerant Coil**
System/Scope Description:	• Same as CUP AWHP approach (H/C 1), except: o Provide VRV Condenser modules at each building (w/ one module being redundant), on existing concrete pad, after demo of DX split system. o The Variable Refrigerant Flow System functions as a Heat Pump, i.e. Heating, and Cooling w/ a single Refrigerant coil. o Construction sequence would involve demo and replace of one AHU coil, and related condenser coil at a time.
Benefits	• Utilize a single coil in AHU for modulating control of heating/cooling • Less site piping than CUP approach, limited to refrigerant piping • No Pumps, buffer tanks • Provides a pathway for retiring aging direct-buried metallic HHW piping • Provides a path to Clean Buildings decarbonization, retiring gas boilers
Drawbacks	• Refrigerant piping in dormitory/sleeping areas • Distributed maintenance • More pieces of equipment in more locations (i.e. N+1 at each building) • Less controls interface, primarily read-only • Requires parallel of central HHW for DHW until DHW is addressed
Redundancy	• Would need to provide separate condensing unit module
Power Requirement	2nd Lowest power consumption option
First Cost	Lowest first cost option
Operating Cost	• 2nd Lowest cost of heating • Lowest cost of cooling • 2nd highest cost of maintenance

Scope/Measure: **M 2**	**Building Air to Water Heat Pump Chillers w/ Heat Recovery (AWHPs)**

System/Scope Description:	• Same as CUP AWHP approach (H/C 1), except:
	  ○ Provide (2) 30T AWHPs at each building (1 backup, 75% of load), on existing concrete pad after DX split system demo.
	  ○ Provide buffer tanks for CHW and HHW at each building
	• Route supply/return chilled water and heating hot water to AHU coils at each building via buried site-routed piping
	• Provide constant volume primary pumps, valves, controls on single modular skid in size increments matching majority of building load hours
	• Provide "Pump House" for pumps, buffer tanks adjacent to AWHPs

Benefits	• Less site piping than CUP approach • Provides long-term value for heating/cooling needs of entire campus • Provides a pathway for retiring aging direct-buried metallic HHW piping • Provides a path to Clean Buildings decarbonization, retiring gas boilers
Drawbacks	• Distributed maintenance • More pieces of equipment in more locations (i.e. N+1 at each building) • More building Electrical work to recircuit Optional Standby power from 4 Condensing units to 2 AWHPs at each building, and related pumps.
Redundancy	• 1 Extra module for backup, rotation, lead/lag capability during defrost/maintenance/failure modes, at <u>each</u> building
Power Requirement	Highest power consumption option
First Cost	2nd Highest first cost option
Operating Cost	• 2nd Lowest cost of heating • 2nd Lowest cost of cooling • Lowest cost of maintenance

Scope/Measure: **M 3**	**CUP Air to Water Heat Pump Chillers w/ Heat Recovery (AWHPs)**
System/Scope Description:	• Demolish DX split systems and refrigerant piping • Provide AWHPs in 30T module increments, and N+1 backup unit • Route supply/return chilled water and heating hot water to AHU coils at each building via buried site-routed piping • Provide central buffer tanks for heating hot water, and chilled water • Provide constant volume primary pumps, valves, controls on single modular skid in size increments matching majority of building load hours • House pumps and buffer tanks in existing CUP, or provide 'Pump House" adjacent to AWHPs
Benefits	• Centralized maintenance • Fewer pieces of equipment, parts- uniformity • All electrical work is close to the CUP, Generator, service entry • Minimal electrical rework in buildings beyond removal of circuits • Provides long-term value for heating/cooling needs of entire campus • Provides a pathway for retiring aging direct-buried metallic HHW piping • Provides a path to Clean Buildings decarbonization, retiring gas boilers
Drawbacks	• Site work, lots of trenching, parallel to existing HHW piping that remains operational until new CHW, and HHW piping are installed • Higher per AHU renovation costs to replace coils
Redundancy	• 1 Extra module at CUP for backup, rotation, lead/lag capability during defrost/maintenance/failure modes. • Redundant Primary and Secondary pumps at CUP
Power Requirement	Lowest campus-wide power demand of all heating/cooling options
First Cost	2nd Lowest first cost of all options
Operating Cost	• 2nd Lowest cost of heating • Lowest cost of cooling • Lowest cost of maintenance

Scope/Measure: ***M 2A*** ***M 3A***	**Gas Fired Boiler backup of Heating Hot Water (HHW) Loop, and DHW**

System/Scope Description:	• Keep adequate gas fired boiler capacity to provide backup heating
	• Possibly in lieu of redundant AWHP units at each building, or at the CUP
	• Tie the existing gas fired HHW system into the AWHP system upstream of storage tanks for trim/backup of heating capacity.
	  ○ This is simplified with a Central AWHP Plant
	  ○ Building by building service requires replacement of HHW loop
	• Plan for smaller modular condensing boilers to retire old large boilers
	• Plan for existing HHW loop replacement
	  ○ -OR- New HHW loop
	  ○ -AND, OR- New DHW loop

Benefits	• Utilizes existing central heating and distribution infrastructure • Provides a pathway for retiring aging direct-buried metallic HHW piping without DHW or HHW interruption • Provides a path to Clean Buildings decarbonization, retiring gas boilers as the primary source of Heating and Domestic Hot Water
Drawbacks	• Keeps some form of natural gas use, albeit as backup, only • If utilizing aging direct buried piping, would be a parallel piping route that eventually needs to be replaced. • Recommend to tie directly in to the new HHW loop and retire aging direct buried piping.
Redundancy	• Too much heating capacity is serving too little load. • This leads to on/off firing swings, system temperature instability • Meets redundancy requirements, but harder on equipment, reduces life.
Power Requirement	
First Cost	Lowest Cost Impact of any Measure due to existing Gas Heating Infrastructure
Operating Cost	

Scope/Measure: ***M 2B*** ***M 3B***	**Electric Boiler backup of Heating Hot Water (HHW) Loop, and DHW**

System/Scope Description:	• Provide Electric boiler capacity to provide backup heating
	  ○ ONLY for capacity lost during low ambient (8°F)
	  ○ -OR- N+1 capacity to replace One CUP heating module
	  ○ -OR- N+1 capacity to replace One Building heating module
	  ○ -OR- Full load capacity of entire CUP heating load
	  ○ -OR- Full load capacity of entire Building heating load
	• Possibly in lieu of redundant units at each building, or at a central AWHP

Benefits	• Provides a path to Clean Buildings decarbonization, retiring gas boilers as the primary source of Heating and Domestic Hot Water
Drawbacks	• Large Electric load impact • Large Standby power impact • 1.0 COP Efficiency, versus ~2.2 COP efficiency • May require load shedding if operating simultaneous with AWHPs • May require load shedding if sized for Entire building load, or CUP load • Adds new/parallel Infrastructure, versus reuse of existing
Redundancy	• Variations in redundancy provisions may be limited by power available
Power Requirement	• Significant Power impact, Generator and Electrical Infrastructure upgrades
First Cost	Highest Cost Impact of any Measure
Operating Cost	

Scope/Measure: ***DDC***	**Replace DDC Controls System**

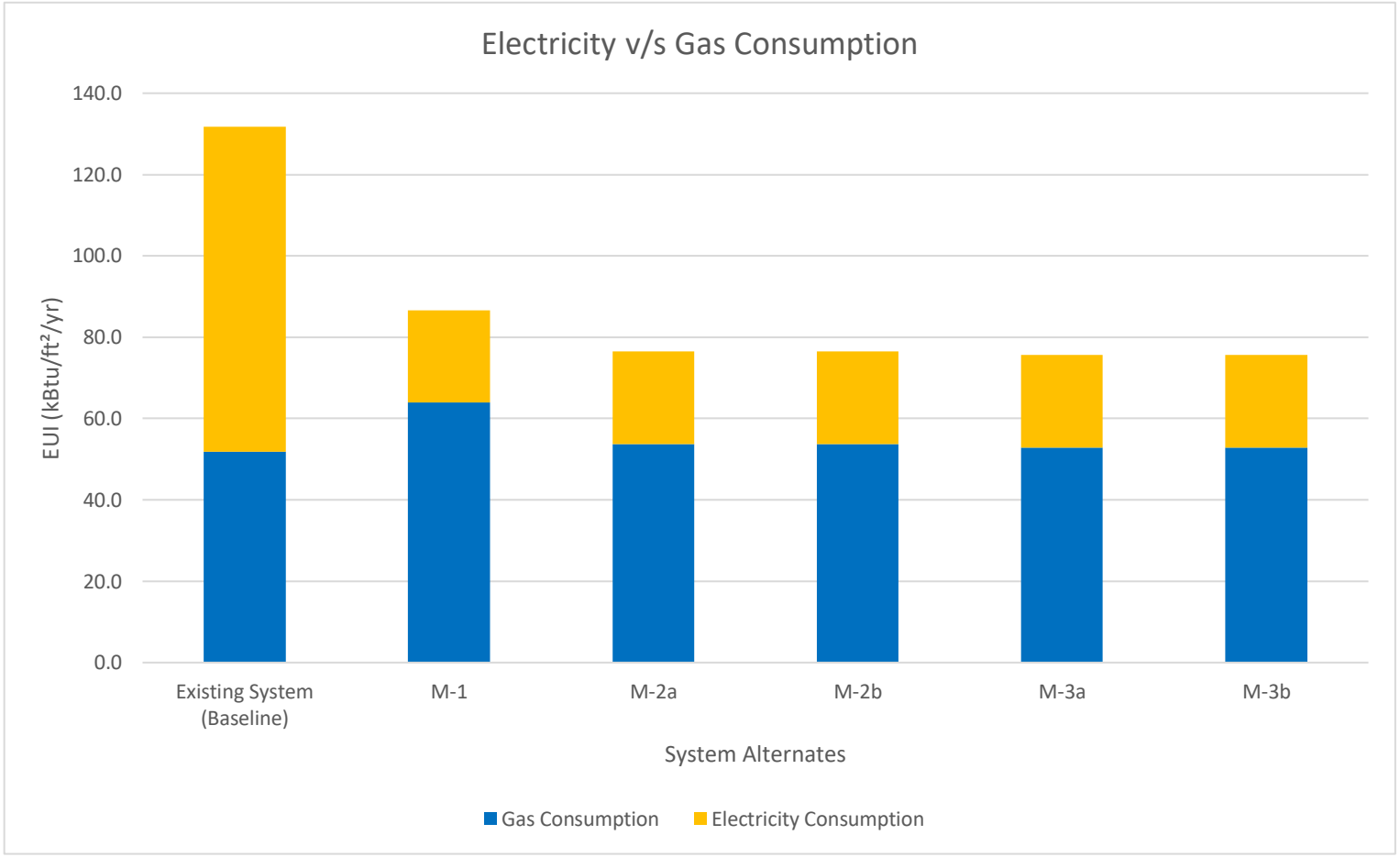
System/Scope Description:	• Replace Head end at CUP
	  o Head end replacement may not be necessary w/ Building by Building approach,
	  o Would need Delta Controls module to translate points from Building to have visibility of New Building Controls, if Head end at CUP not replaced
	• Replace Jace at each building
	  o Can be stand alone, ready for future Head End connection
	• Map existing points to new Controls systems
	  o Can also map to existing Delta Controls, but invests in old system
	• Provide new Application Specific Controllers at standalone equipment and for Stand Alone buildings
	• Replace all Actuators, Switches, Sensors for Valves, Dampers, Temperature, Pressure, etc. throughout Building
	  o AHUs, Fans, Cooling, Heating, Pumps

Benefits	• Replace failed Actuators for Dampers, Valves • Replace aging Temperature and Pressure Sensors, Switches • Updated programming • Improved Building/Campus Efficiency • Improved visibility, controls response time, network speed
Drawbacks	•
Redundancy	• Backup power would be provided • It is recommended to have a spare Jace at each building with parallel, updated programming for switchover if there is a board failure • It is recommended to have a spare board at the Head End with parallel updated programming for switchover if there is a board failure.
Power Requirement	
First Cost	
Operating Cost	
Energy Use	
Heating Power	
Cooling Power	
DHW Power	
Heating Gas Use	
DHW Gas Use	

Scope/Measure: **DW 1**	**CUP Domestic Water Heater Heat Pumps (DWH HPs)**
System/Scope Description:	• Demolish existing double wall Heating Hot Water (HHW) convertors • Provide Centrally located Heat Pump Water Heater Modules, Load plus 1 (N+1) • Provide Storage tanks to reduce gallons per hour recovery required • Provide "Pump House" for pumps, storage tanks, and HPWH not having low-ambient compatibility
Benefits	• Can be installed in existing CUP • Provides a pathway for retiring aging direct-buried metallic HHW piping • Provides a path to Clean Buildings decarbonization, retiring gas boilers
Drawbacks	• Few mfctr. options for low-ambient outdoor installation without losing capacity, derating. Would require space in the CUP, or addition of a "Pump House" to protect from ambient conditions • Many options have difficulty maintaining a 140F LWT. This is key to storage design, legionella mitigation, etc.
Redundancy	• 1 Extra module at CUP for backup, rotation, lead/lag capability during defrost/maintenance/failure modes. • Redundant pumps at CUP
Power Requirement	• Increases Electrical power consumption to derive heating from mechanical work, rather than combustion. • More efficient power consumption than Electric Boilers
First Cost	Involves new DHW distribution loop. Old HHW has to be replaced, regardless
Operating Cost	• Centralized maintenance, simplified boiler backup • Increased cost for DHW production due to higher Electric vs Gas $/Btu

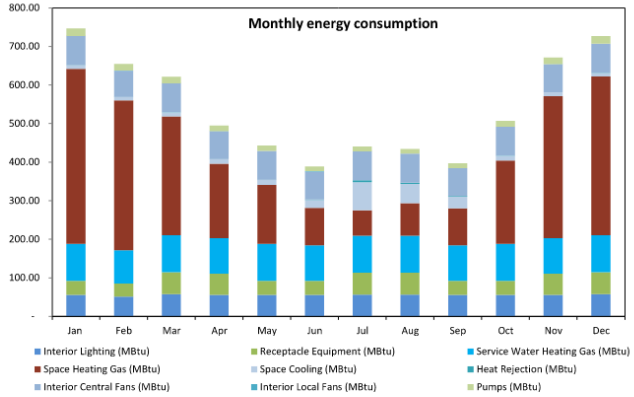
Scope/Measure: **DW 2**	**Building Domestic Water Heater Heat Pumps (DWH HPs)**
System/Scope Description:	• Demolish existing double wall Heating Hot Water (HHW) convertors • Provide Heat Pump Water Heater Modules at each building, Load plus 1 (N+1) • Provide Storage tanks to reduce gallons per hour recovery required • Provide "Pump House" for pumps, storage tanks, and HPWH not having low-ambient compatibility
Benefits	• Provides a pathway for retiring aging direct-buried metallic HHW piping • Provides a path to Clean Buildings decarbonization, retiring gas boilers
Drawbacks	• Distributed maintenance • More pieces of equipment, due to duplicated redundancy • Few mfctr. options for low-ambient outdoor installation without losing capacity, derating. Requires addition of a "Pump House" to protect from ambient conditions, due to restricted Mechanical Room space • Many options have difficulty maintaining a 140F LWT. This is key to storage design, legionella mitigation, etc.
Redundancy	• 1 Extra module for backup, rotation, lead/lag capability during defrost/maintenance/failure modes, at each building
Power Requirement	• Increases Electrical power consumption to derive heating from mechanical work, rather than combustion. • More efficient power consumption than Electric Boilers
First Cost	• CUP Boiler as backup requires HX and pumps at each building • Requires new DHW distribution loop. Old HHW has to be replaced, regardless
Operating Cost	• Distributed WH locations increases maintenance, versus CUP • Increased cost for DHW production due to higher Electric vs Gas $/Btu

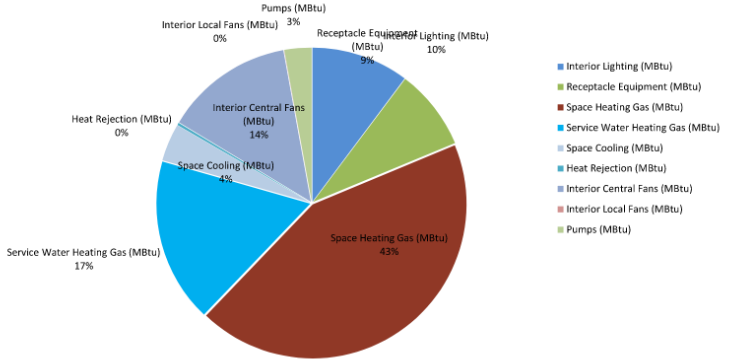
APPENDIX E
ELCCA RESULTS


Electricity v/s Gas Consumption
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
EUI (kBtu/ft²/yr)
Existing System (Baseline)
M-1
M-2a
M-2b
M-3a
M-3b
System Alternates
Gas Consumption
Electricity Consumption

IES File: **25_009_HGS_Green Hill School_R2_VE24**
HVAC File: **Existing**
Simulation File: **Existing_R9.aps**
Date: **3/25/2025**

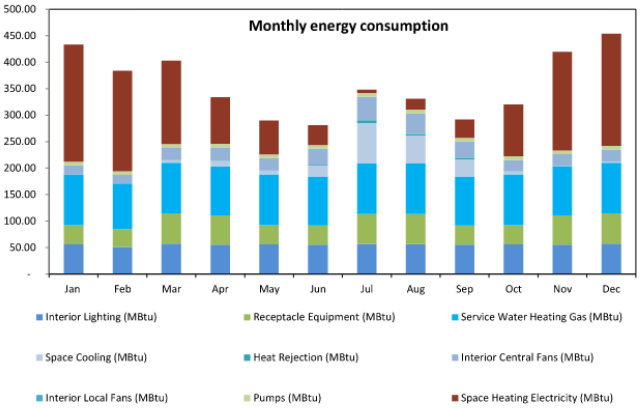
Date	Interior Lighting (MBtu)	Exterior Lighting (MBtu)	Receptacle Equipment (MBtu)	Data Centre Equipment (MBtu)	Elevators & Escalators (MBtu)	Refrigeration (MBtu)	Other Process (MBtu)	Space Heating Gas (MBtu)	Space Heating Electricity (MBtu)	Service Water Heating Gas (MBtu)	Service Water Heating Electricity (MBtu)	Space Cooling (MBtu)	Heat Rejection (MBtu)	Interior Central Fans (MBtu)	Interior Local Fans (MBtu)	Exhaust/Process Fans (MBtu)	Pumps (MBtu)	Natural Gas (MBtu)	Electricity Generation (MBtu)	Operational Electricity (MBtu)	Total Operational Energy (Mbtu)	Total Net Energy (Mbtu)	Electricity (kWh)
Jan	55.62		36.70					453.99		95.59		9.33	0.60	74.94	0.12		20.03	549.58		197.34	746.92		57,837
Feb	51.25		33.70					388.73		86.35		8.59	0.55	67.68	0.11		17.66	475.07		179.54	654.61		52,620
Mar	57.58		57.17					308.22		95.61		10.08	0.64	74.94	0.13		17.25	403.83		217.78	621.61		63,828
Apr	55.47		55.19					192.41		92.53		11.45	0.73	72.52	0.13		14.61	284.95		210.08	495.03		61,572
May	55.62		36.70					152.56		95.62		13.02	0.83	74.94	0.12		14.02	248.18		195.26	443.44		57,227
Jun	55.47		36.40					96.71		92.55		20.97	1.34	72.52	0.13		12.33	189.26		199.16	388.41		58,370
Jul	56.65		56.66					65.97		95.63		73.51	4.69	74.94	0.18		11.88	161.60		278.50	440.10		81,625
Aug	56.56		56.62					84.96		95.63		49.75	3.18	74.94	0.16		12.59	180.59		253.79	434.38		74,383
Sep	55.47		36.40					95.25		92.55		30.41	1.94	72.52	0.14		12.23	187.79		209.11	396.90		61,287
Oct	55.62		36.70					216.08		95.62		12.13	0.77	74.94	0.12		15.40	311.69		195.69	507.39		57,354
Nov	55.47		55.19					368.07		92.52		9.24	0.59	72.52	0.12		18.19	460.59		211.31	671.90		61,933
Dec	57.58		57.17					411.69		95.60		9.55	0.61	74.94	0.12		19.35	507.28		219.31	726.59		64,276
Total	668.36	-	554.60	-	-	-	-	2,834.62	-	1,125.79	-	258.04	16.47	882.30	1.58	-	185.54	3,960.41	-	2,566.89	6,527.29	6,527.29	752,312
EUI	**13.5**	-	**11.2**	-	-	-	-	**57.2**	-	**22.7**	-	**5.2**	**0.3**	**17.8**	**0.0**	-	**3.7**	**80.0**	-	**51.8**	**131.8**	**131.8**	
Baseline EUI																							
Area (SF)	49,518																						

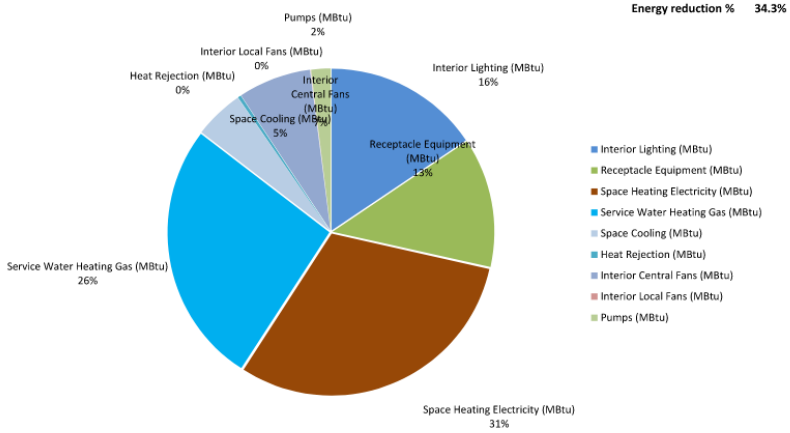




IES File: **25_009_HGS_Green Hill School_R2_VE24**
HVAC File: **M-1**
Simulation File: **M-1_R6.aps**
Date: **3/24/2025**

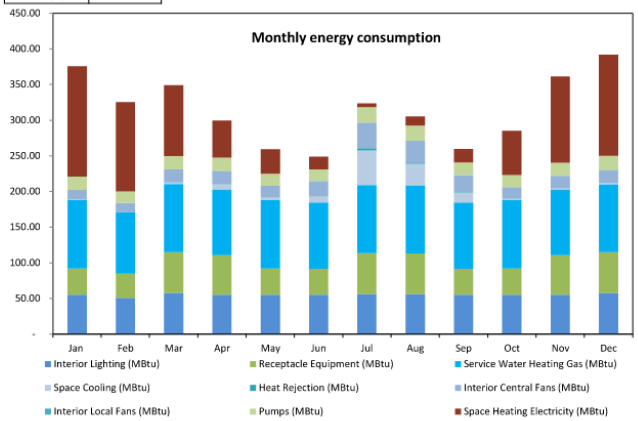
Date	Interior Lighting (MBtu)	Exterior Lighting (MBtu)	Receptacle Equipment (MBtu)	Data Centre Equipment (MBtu)	Elevators & Escalators (MBtu)	Refrigeration (MBtu)	Other Process (MBtu)	Space Heating Gas (MBtu)	Space Heating Electricity (MBtu)	Service Water Heating Gas (MBtu)	Service Water Heating Electricity (MBtu)	Space Cooling (MBtu)	Heat Rejection (MBtu)	Interior Central Fans (MBtu)	Interior Local Fans (MBtu)	Exhaust/Process Fans (MBtu)	Pumps (MBtu)	Natural Gas (MBtu)	Electricity Generation (MBtu)	Operational Electricity (MBtu)	Total Operational Energy (MBtu)	Total Net Energy (MBtu)	Electricity (kWh)
Jan	55.62		36.70					-	220.75	95.66		0.00	-	17.17	0.12		7.19	95.66		337.57	433.23		98,936
Feb	51.25		33.70					-	190.38	86.40		-	-	15.78	0.11		6.50	86.40		297.71	384.11		87,255
Mar	57.58		57.17					-	157.65	95.66		4.14	0.26	23.31	0.14		7.19	95.66		307.44	403.09		90,104
Apr	55.47		55.19					-	88.18	92.57		10.65	0.67	24.21	0.14		6.96	92.57		241.46	334.03		70,767
May	55.62		36.70					-	63.35	95.66		6.92	0.42	23.65	0.13		7.19	95.66		193.98	289.64		56,853
Jun	55.47		36.40					-	37.87	92.57		20.92	1.30	29.77	0.13		6.96	92.57		188.83	281.40		55,343
Jul	56.65		56.66					-	6.43	95.66		76.31	4.86	44.47	0.18		7.19	95.66		252.74	348.39		74,073
Aug	56.56		56.62					-	20.36	95.66		52.53	3.34	38.28	0.17		7.19	95.66		235.05	330.70		68,888
Sep	55.47		36.40					-	34.54	92.57		32.06	2.02	31.71	0.15		6.96	92.57		199.31	291.88		58,414
Oct	55.62		36.70					-	98.15	95.66		5.45	0.32	21.23	0.13		7.19	95.66		224.79	320.45		65,883
Nov	55.47		55.19					-	185.99	92.57		1.48	0.09	21.76	0.13		6.96	92.57		327.06	419.63		95,856
Dec	57.58		57.17					-	211.40	95.66		1.91	0.12	22.34	0.13		7.19	95.66		357.84	453.50		104,878
Total	668.36	-	554.60	-	-	-	-	-	1,315.04	1,126.26	-	212.35	13.40	313.68	1.66	-	84.67	1,126.26	-	3,163.77	4,290.03	4,290.03	927,248
EUI	**13.5**	-	**11.2**	-	-	-	-	-	**26.6**	**22.7**	-	**4.3**	**0.3**	**6.3**	**0.0**	-	**1.7**	**22.7**	-	**63.9**	**86.6**	**86.6**	
Baseline EUI	**13.5**	-	**11.2**	-	-	-	-	**57.2**	-	**22.7**	-	**5.2**	**0.3**	**17.8**	**0.0**	-	**3.7**	**80.0**	-	**51.8**	**131.8**	**131.8**	
Area (SF)	49,518																			**Energy reduction %**		**34.3%**	

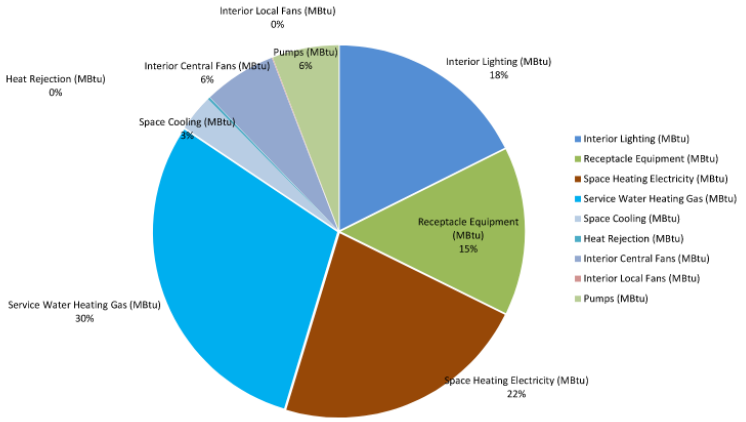




IES File: **25_009_HGS_Green Hill School_R2_VE24**
HVAC File: **M-2a**
Simulation File: **M-2a_R4.aps**
Date: **3/26/2025**

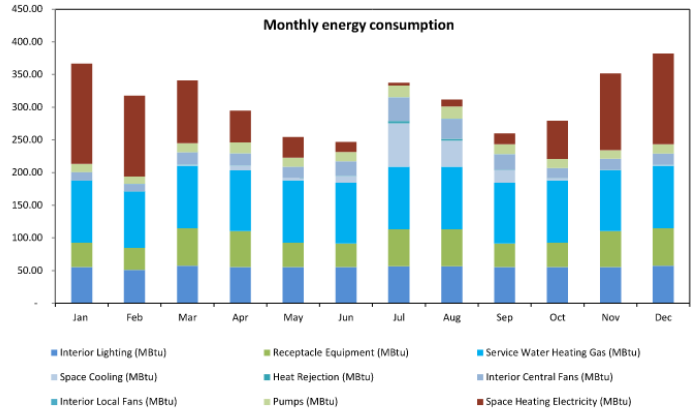
Date	Interior Lighting (MBtu)	Exterior Lighting (MBtu)	Receptacle Equipment (MBtu)	Data Centre Equipment (MBtu)	Elevators & Escalators (MBtu)	Refrigeration (MBtu)	Other Process (MBtu)	Space Heating Gas (MBtu)	Space Heating Electricity (MBtu)	Service Water Heating Gas (MBtu)	Service Water Heating Electricity (MBtu)	Space Cooling (MBtu)	Heat Rejection (MBtu)	Interior Central Fans (MBtu)	Interior Local Fans (MBtu)	Exhaust/Process Fans (MBtu)	Pumps (MBtu)	Natural Gas (MBtu)	Electricity Generation (MBtu)	Operational Electricity (MBtu)	Total Operational Energy (MBtu)	Total Net Energy (MBtu)	Electricity (kWh)	Gas (therm)
Jan	55.62		36.70					-	155.11	95.59		0.45	0.03	13.92	0.12		18.39	95.59		280.35	375.94		82,165	956
Feb	51.25		33.70					-	125.07	86.35		0.29	0.02	12.16	0.11		16.41	86.35		239.01	325.35		70,050	863
Mar	57.58		57.17					-	99.71	95.61		2.41	0.15	18.05	0.14		18.46	95.61		253.66	349.27		74,343	956
Apr	55.47		55.19					-	51.83	92.53		6.43	0.41	18.44	0.14		19.09	92.53		206.99	299.52		60,665	925
May	55.62		36.70					-	34.51	95.62		3.45	0.22	16.55	0.13		16.51	95.62		163.70	259.32		47,976	956
Jun	55.47		36.40					-	17.90	92.55		8.23	0.53	21.36	0.13		16.31	92.55		156.33	248.87		45,817	925
Jul	56.65		56.66					-	5.51	95.63		48.93	3.12	35.77	0.18		21.36	95.63		228.17	323.80		66,872	956
Aug	56.56		56.62					-	12.88	95.63		29.76	1.90	30.49	0.16		21.37	95.63		209.74	305.37		61,470	956
Sep	55.47		36.40					-	19.06	92.55		14.13	0.90	23.87	0.14		17.30	92.55		167.27	259.82		49,024	925
Oct	55.62		36.70					-	62.02	95.62		2.63	0.17	15.42	0.13		17.01	95.62		189.71	285.33		55,601	956
Nov	55.47		55.19					-	120.76	92.52		1.73	0.11	16.90	0.13		18.37	92.52		268.64	361.16		78,735	925
Dec	57.58		57.17					-	142.06	95.60		1.97	0.13	17.82	0.13		19.40	95.60		296.26	391.85		86,828	956
Total	668.36	-	554.60	-	-	-	-	-	846.43	1,125.79	-	120.41	7.69	240.74	1.63	-	219.96	1,125.79	-	2,659.82	3,785.60	3,785.60	779,547	11,258
EUI	**13.5**	-	**11.2**	-	-	-	-	-	**17.1**	**22.7**	-	**2.4**	**0.2**	**4.9**	**0.0**	-	**4.4**	**22.7**	-	**53.7**	**76.4**	**76.4**		
Baseline EUI	**13.5**	-	**11.2**	-	-	-	-	**57.2**	-	**22.7**	-	**5.2**	**0.3**	**17.8**	**0.0**	-	**3.7**	**80.0**	-	**51.8**	**131.8**	**131.8**		
Area (SF)	49,518																			**Energy reduction %**		**42.0%**		

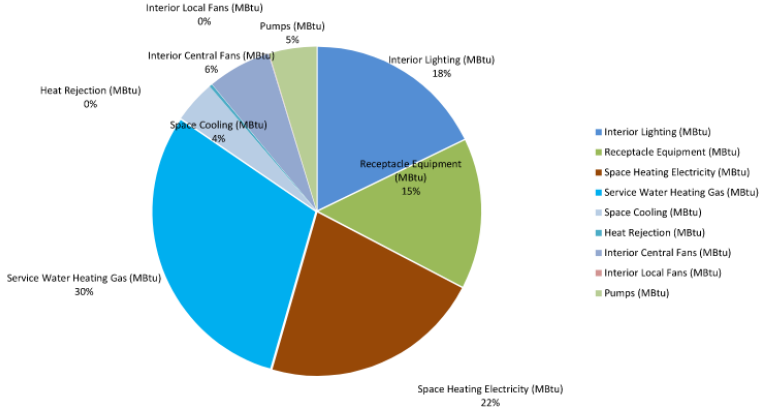




IES File: **25_009_HGS_Green Hill School_R2_VE24**
HVAC File: **M-3a_Rev2**
Simulation File: **M-3a_R8.aps**
Date: **3/26/2025**

Date	Interior Lighting (MBtu)	Exterior Lighting (MBtu)	Receptacle Equipment (MBtu)	Data Centre Equipment (MBtu)	Elevators & Escalators (MBtu)	Refrigeration (MBtu)	Other Process (MBtu)	Space Heating Gas (MBtu)	Space Heating Electricity (MBtu)	Service Water Heating Gas (MBtu)	Service Water Heating Electricity (MBtu)	Space Cooling (MBtu)	Heat Rejection (MBtu)	Interior Central Fans (MBtu)	Interior Local Fans (MBtu)	Exhaust/Process Fans (MBtu)	Pumps (MBtu)	Natural Gas (MBtu)	Electricity Generation (MBtu)	Operational Electricity (MBtu)	Total Operational Energy (MBtu)	Total Net Energy (MBtu)	Electricity (kWh)	Gas (therm)
Jan	55.62		36.70						153.26	95.59		0.17	0.01	12.56	0.12		12.93	95.59		271.38	366.98		79,538	956
Feb	51.25		33.70						123.62	86.35		0.08	0.01	11.20	0.11		11.35	86.35		231.32	317.66		67,795	863
Mar	57.58		57.17						96.41	95.61		2.51	0.16	17.67	0.14		13.98	95.61		245.60	341.21		71,982	956
Apr	55.47		55.19						48.85	92.53		7.33	0.47	18.38	0.14		16.64	92.53		202.47	295.00		59,340	925
May	55.62		36.70						31.88	95.62		4.01	0.26	16.55	0.13		13.70	95.62		158.85	254.48		46,557	956
Jun	55.47		36.40						15.70	92.55		10.63	0.68	21.37	0.13		14.18	92.55		154.56	247.11		45,300	925
Jul	56.65		56.66						4.19	95.63		66.11	4.22	35.69	0.18		17.98	95.63		241.66	337.29		70,825	956
Aug	56.56		56.62						10.51	95.63		40.23	2.57	30.49	0.16		18.92	95.63		216.05	311.68		63,321	956
Sep	55.47		36.40						16.72	92.55		18.67	1.19	23.87	0.14		14.70	92.55		167.17	259.71		48,994	925
Oct	55.62		36.70						59.15	95.62		3.30	0.21	15.25	0.13		13.71	95.62		184.07	279.68		53,947	956
Nov	55.47		55.19						117.68	92.52		1.45	0.09	16.20	0.13		13.16	92.52		259.37	351.89		76,018	925
Dec	57.58		57.17						138.83	95.60		1.78	0.11	16.74	0.13		14.19	95.60		286.53	382.13		83,977	956
Total	668.36	-	554.60	-	-	-	-	-	816.79	1,125.79	-	156.27	9.98	235.97	1.63	-	175.43	1,125.79	-	2,619.03	3,744.82	3,744.82	767,594	11,258
EUI	13.5	-	11.2	-	-	-	-	-	16.5	22.7	-	3.2	0.2	4.8	0.0	-	3.5	22.7	-	52.9	75.6	75.6		
Baseline EUI	13.5	-	11.2	-	-	-	-	57.2	-	22.7	-	5.2	0.3	17.8	0.0	-	3.7	80.0	-	51.8	131.8	131.8		
Area (SF)	49,518																			**Energy reduction %**		**42.6%**		





Office of Financial Management
Olympia, Washington - Version: 2022-A
Evaluation Life Cycle Cost Analysis Tool

General Information Page

Project Information	
Project Name	Green Hill School
Address	375 SW 11th St
City	Chehalis
Zip Code	98532
Building Square Feet (Gross)	51,385
Useable Square Feet	
Building Type (i.e. Office, School)	Correctional Facility
Construction Type (i.e. New, Retrofit)	Retrofit
Project Phase	Schematic Design
Report Version/Revision	
Date of Report	3/31/2025

User Information	
Company Name	Hargis Engineers
User First Name	Akshita
User Last Name	Mathur
Contact Number	206.727.6576
Contact Email	akshita.mathur@hargis.biz

Key Variables	◉ OFM	○ User	Value
Building Life	50	50	50
Nominal Discount Rate	2.98%	2.98%	2.98%
Real Discount Rate	-3.81%	-3.81%	-3.81%
Standard Maintenance Escalation	1.00%	1.00%	1.00%
General Inflation	7.06%	7.06%	7.06%
Study Period (years)	50	50	50
Fuel Escalation Assumptions Located on Fuel Escalation Page			

Timing Variables	Year(s)	
Base Year (Generally Current Year)	2025	
Additional Construction Years beyond 2025	0	1st Operation Year = 2026

Office of Financial Management
Olympia, Washington - Version: 2022-A
Evaluation Life Cycle Cost Analysis Tool

ELCCAT Inputs & Report

ELCCA Results Table	PV of Capital Cost	PV of Maint. Costs	PV of Utility Costs	Total Life Cycle Cost	Net Present Savings	NPS w/SCC	EUI
Baseline:M1 - Distributed VRV (gas backup)	$17,947,908	$7,132,107	$9,569,626	$34,649,641	N/A	N/A	83.5
M2a - Distributed AWHP (gas backup)	$18,084,070	$6,947,162	$8,534,075	$33,565,307	$1,084,334	$1,111,069	73.7
M2b - Distributed AWHP (electric backup)	$20,449,470	$6,947,162	$8,534,075	$35,930,707	($1,281,066)	($1,254,331)	73.7
M3a - Centralized AWHP (gas backup)	$13,877,331	$6,612,290	$8,450,373	$28,939,994	$5,709,648	$5,738,501	72.9
M3b - Centralized AWHP (electric backup)	$19,067,874	$6,612,290	$8,450,373	$34,130,536	$519,105	$547,959	72.9
0	$0	$0	$0	$0	$34,649,641	$36,143,822	0.0
0	$0	$0	$0	$0	$34,649,641	$36,143,822	0.0
0	$0	$0	$0	$0	$34,649,641	$36,143,822	0.0
0	$0	$0	$0	$0	$34,649,641	$36,143,822	0.0
0	$0	$0	$0	$0	$34,649,641	$36,143,822	0.0

Project:	Green Hill School	
Analysts Firm:	Hargis Engineers	
Electric Rate ($/KWH):	$0.05	Sq.Ft.. for EUI Calc
Natural Gas Rate ($/Therm):	$1.36	51,385

NPS = Net Present Savings, SCC = Social Cost of Carbon Dioxide Pollution, EUI = Energy Use Intensity (kBtu/sq.ft.), SIR = Savings to Investment Ratio (Net Present Savings/Incremental PV of Capital Costs)

M1 - Distributed VRV (gas backup)

	Weighted Average and Totals	28.8	$4,672,179	$32,765	Narrative
	Component Description	Useful Life	Installed Cost	Annual Maintenance	REF #
1	Non Re-Occurring Upfront Costs	50	$1,194,279.00	$32,764.71	
2	AHUs	30	$783,840.00		
3	Boilers	30	$128,766.00		
4	Pumps	25	$857,914.00		
5	Heat Exchangers	25	$25,415.00		
6	Condensing Units	15	$741,750.00		
7	Refrigerant Piping	18	$68,227.00		
8	Controls - HVAC	15	$783,570.00		
9	Controls - Refrigerant Monitoring	15	$ 88,418.00		
10					
	Annual Elec Consumption (KWH)	927,248	Annual Electric Costs	$42,468	
	Annual N.G. Consumption (Therms)	11,263	Annual N.G. Costs	$15,317	

M3a - Centralized AWHP (gas backup)

	Weighted Average and Totals	38.6	$5,957,871	$30,377	Narrative
	Component Description	Useful Life	Installed Cost	Annual Maintenance	REF #
1	Non Re-Occurring Upfront Costs	50	$3,454,698.00	$30,376.68	
2	AHUs	30	$783,840.00		
3	Boilers (gas)	30	$199,727.00		
4	Pumps	25	$134,471.00		
5	Heat Exchangers	25	$25,415.00		
6	AWHPs	20	$618,125.00		
7	Controls - HVAC	15	$741,595.00		
8					
9					
10					
	Annual Elec Consumption (KWH)	767,594	Annual Electric Costs	$35,156	
	Annual N.G. Consumption (Therms)	11,258	Annual N.G. Costs	$15,311	

M2a - Distributed AWHP (gas backup)

	Weighted Average and Totals	36.1	$6,989,436	$31,915	Narrative
	Component Description	Useful Life	Installed Cost	Annual Maintenance	REF #
1	Non Re-Occurring Upfront Costs	50	$2,846,431.00	$31,915.08	
2	AHUs	30	$783,840.00		
3	Boilers (gas)	30	$208,766.00		
4	Pumps	25	$335,239.00		
5	Heat Exchangers	25	$767,165.00		
6	AWHPs	20	$741,750.00		
7	Controls - HVAC	15	$783,570.00		
8	Pump Sheds	50	$522,675.00		
9					
10					
	Annual Elec Consumption (KWH)	779,547	Annual Electric Costs	$35,703	
	Annual N.G. Consumption (Therms)	11,258	Annual N.G. Costs	$15,311	

M3b - Centralized AWHP (electric backup)

	Weighted Average and Totals	39.5	$8,563,888	$30,377	Narrative
	Component Description	Useful Life	Installed Cost	Annual Maintenance	REF #
1	Non Re-Occurring Upfront Costs	50	$5,215,066.00	$30,376.68	
2	AHUs	30	$783,840.00		
3	Boilers (electric)	25	$212,877.00		
4	Pumps	25	$134,471.00		
5	Heat Exchangers	25	$857,914.00		
6	AWHPs	20	$618,125.00		
7	Controls - HVAC	15	$741,595.00		
8					
9					
10					
	Annual Elec Consumption (KWH)	767,594	Annual Electric Costs	$35,156	
	Annual N.G. Consumption (Therms)	11,258	Annual N.G. Costs	$15,311	

M2b - Distributed AWHP (electric backup)

	Weighted Average and Totals	39.0	$8,952,960	$31,915	Narrative
	Component Description	Useful Life	Installed Cost	Annual Maintenance	REF #
1	Non Re-Occurring Upfront Costs	50	$4,796,805.00	$31,915.08	
2	AHUs	30	$783,840.00		
3	Boilers (electric)	25	$221,916.00		
4	Pumps	25	$335,239.00		
5	Heat Exchangers	25	$767,165.00		
6	AWHPs	20	$741,750.00		
7	Controls - HVAC	15	$783,570.00		
8	Pump Sheds	50	$522,675.00		
9					
10					
	Annual Elec Consumption (KWH)	779,547	Annual Electric Costs	$35,703	
	Annual N.G. Consumption (Therms)	11,258	Annual N.G. Costs	$15,311	

	Weighted Average and Totals		$0	$0	Narrative
	Component Description	Useful Life	Installed Cost	Annual Maintenance	REF #
1	Non Re-Occurring Upfront Costs	50			
2					
3					
4					
5					
6					
7					
8					
9					
10					
	Annual Elec Consumption (KWH)		Annual Electric Costs	$0	
	Annual N.G. Consumption (Therms)		Annual N.G. Costs	$0	

Cost Opinion

ELCCA Summary

HARGIS
1201 third avenue, ste 600
seattle, washington 98101
206.448.3376
www.hargis.biz

Green Hill School - Campus HVAC Upgrades

DES/DCYF

DATE April 4, 2025

BASIS OF OPINION Predesign

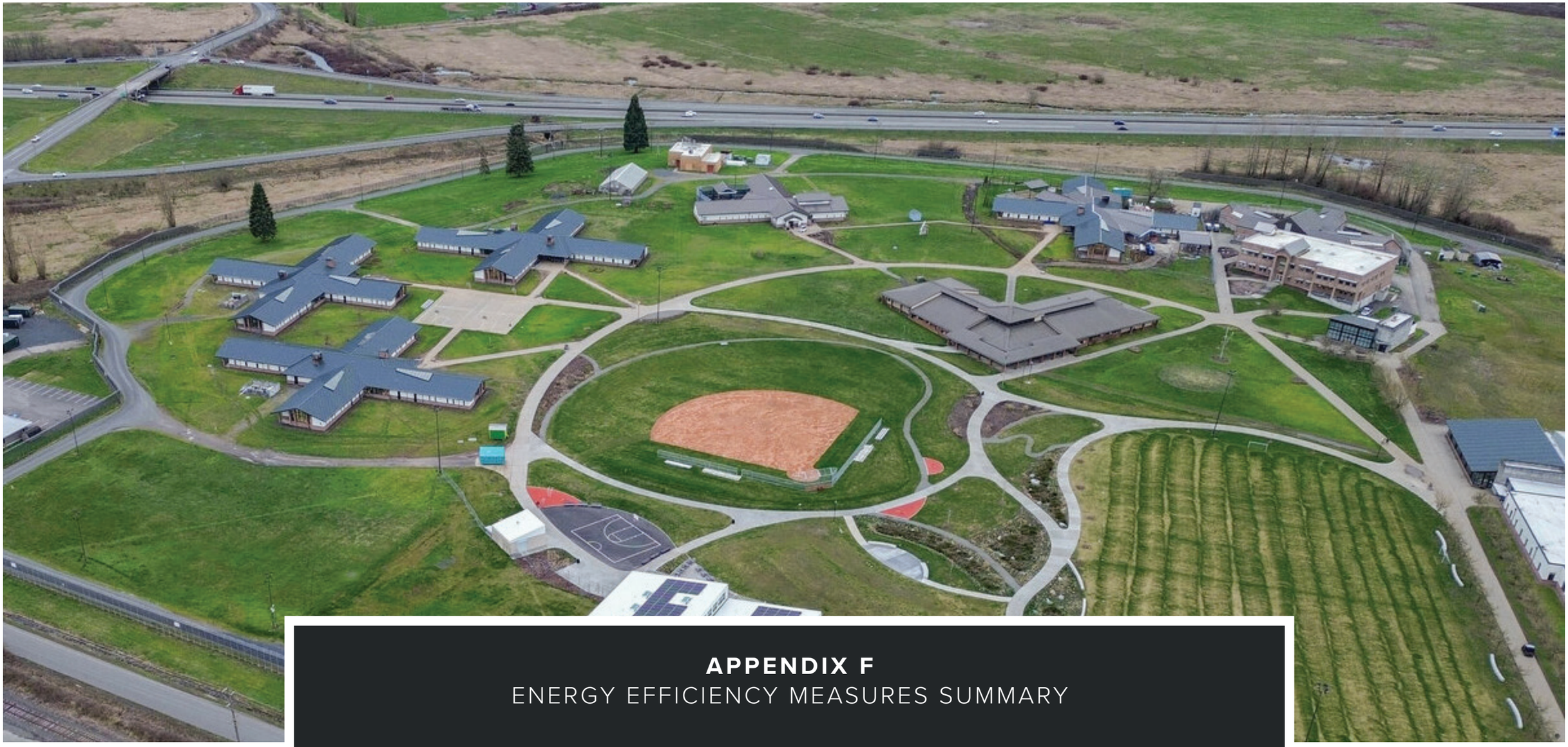
PREPARED BY Robert Kuchcinski
Erik Stearns

JOB NUMBER 24215

CHECKED BY Ron Eliason

ELCCA Number	ELCCA Description	Budget Cost	Notes
ELCCA 1A	Distributed VRV w/ Gas Boiler HHW Backup	$ 4,672,179	
ELCCA 1B	Distributed VRV w/ ELECTRIC BOILER HHW Backup	$ 7,346,798	
ELCCA 2A	Distributed AWHP w/ Gas Boiler HHW Backup	$ 6,909,436	
ELCCA 2B	Distributed AWHP w/ ELECTRIC BOILER HHW Backup	$ 8,952,960	
ELCCA 3A	Central AWHP w/ Gas Boiler HHW Backup	$ 5,877,871	
ELCCA 3B	Central AWHP w/ ELECTRIC BOILER HHW Backup	$ 8,563,888	

ELCCA Total: $ 42,323,132



APPENDIX F
ENERGY EFFICIENCY MEASURES SUMMARY

ENERGY EFFICIENCY MEASURES

To realize the benefits of the proposed approach and optimize the state's investment in system upgrades, the Campus HVAC Improvement Project includes current scopes of work focused on the heating hot water, chilled water, and domestic hot water systems—and their associated equipment. The proposed upgrades will introduce advanced controls and reduce both campus energy use and Central Utility Plant demand. The planned measures reduce Energy Use Intensity (EUI) while advancing decarbonization by shifting to electric-driven heating equipment.

Centralized Air-to-Water Heat Pump (AWHP) Heating & Cooling
The central plant will be modified to add electric AWHP units that generate high-temperature heating hot water and chilled water for campus distribution. These units outperform the existing air-cooled chillers and replace natural-gas boilers, lowering overall EUI and natural-gas consumption while increasing electrical demand.

Building Controls Upgrades
Replace aging or failing direct digital control (DDC) systems across all buildings with a unified, open-system controls architecture.

Install new DDC wiring and communication devices as needed to enable centralized operational visibility, command, and control

Remap all existing building control points (input, output, digital, and analog) as components are replaced, including:

- Dampers and damper actuators
- Valves and valve actuators
- Temperature, pressure, and airflow/waterflow sensors
- Fan and pump motor speed controllers (e.g., VFDs, ECM motors)

Connect previously stand-alone buildings and those with differing controls brands to a centralized DDC head-end at the CUP.

Mechanical System Enhancements
Replace constant volume fans with variable air volume (VAV) fans equipped with VFDs and updated control sequences for supply, return, and, where applicable, exhaust fans.

Replace constant volume pumps with variable speed drive (VSD) pumps with VFDs and updated sequences for heating hot water and domestic hot water systems; this strategy will also be applied to new campus chilled water pumps.

Replace staged-control, refrigerant-based DX cooling coils and compressors with fully modulating variable refrigerant volume (VRV) and variable-speed compressor technology on CO_2 AWHP equipment.

Control Strategy Improvements
Shift from constant/manual temperature and pressure setpoints to dynamic, variable strategies, such as:

- Temperature reset based on measured delta T (dT) demand
- 100% outside air (OA) economizers with sequences for partial mechanical cooling when outdoor temperatures allow

Install airflow measurement stations on outside air, supply air, return air, and exhaust air to maintain constant airflow offsets and ensure building pressurization during all operating modes.

Ventilation and Energy Recovery
In future mechanical upgrades involving buildings that require 100% outside air (e.g., laundry, kitchens, vocational spaces), install Countra-flow air-to-air plate heat exchangers in AHUs. This will reduce energy consumption for both heating and cooling by recovering heat and lowering demand on central plant systems.

System Buffering and Peak Load Management
Implement central buffer tanks at the CUP for both chilled water and heating hot water loops. These reduce peak load demands, accommodate temperature extremes, reduce compressor cycling, and support full-load, high-efficiency operation schedules.

Install domestic hot water (DHW) storage tanks in each building's DHW loop to reduce peak building DHW loads. This allows for downsizing the double-wall heat exchangers and reduces peak HHW demand at the CUP. This is especially beneficial for
high-demand spaces such as laundries and kitchens.

Commissioning and Training
Commissioning of all new and replacement mechanical systems is included, in accordance with Washington State Energy Code (WSEC) requirements.

Comprehensive training for maintenance staff on new building control systems, sequences, setpoints, and operations is planned as part of the project delivery.

Electrical Systems
As buildings are separately renovated over time, space and campus grounds lighting luminaires, lighting controls systems, and wiring will be upgraded to reduce power consumption by lighting.

APPENDIX G

RECOMMENDED OPTION - PHASING PLAN

GHSC PROFILE

1 LAUNDRY (1998)

2 WASTE MANAGEMENT FACILITY

3 ADMIN/ ENTRY/ VISITOR/SECURITY (1998)

4 VOCATIONAL (1998)

5 DINING (1998)

6 MULTIPURPOSE (1998)

7 HEALTHCARE/ ADMIN (2009)

8 WILLOW (2009)

9 BAKER (1998, 2017/2023 remodel)

10 EDUCATION (1981)

11 CYPRESS (2012)

12 HAWTHORNE (1998)

13 MAPLE (1998)

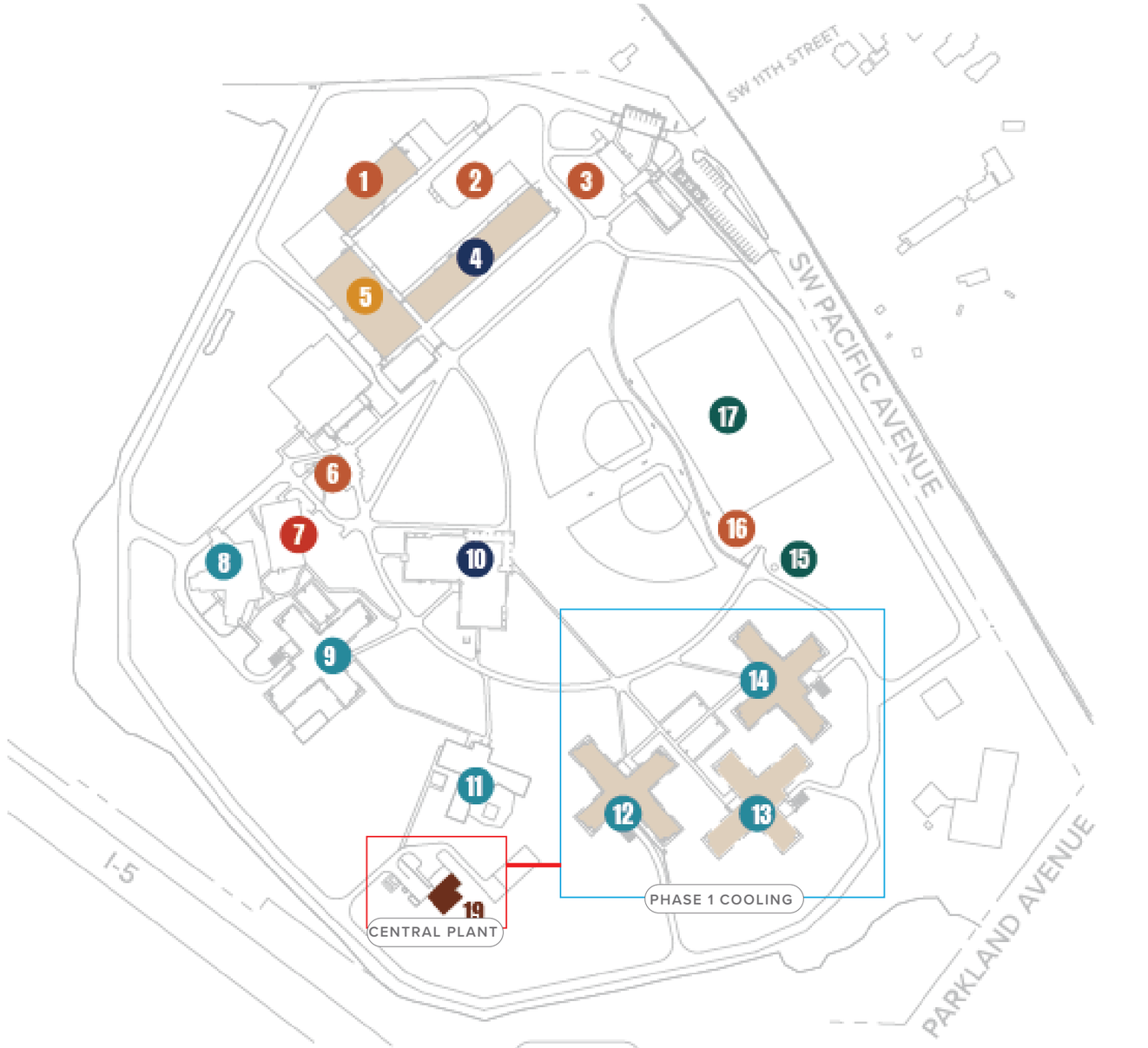
14 SPRUCE (1998)

15 SWEAT LODGE

16 BATHROOM / SHED (1998)

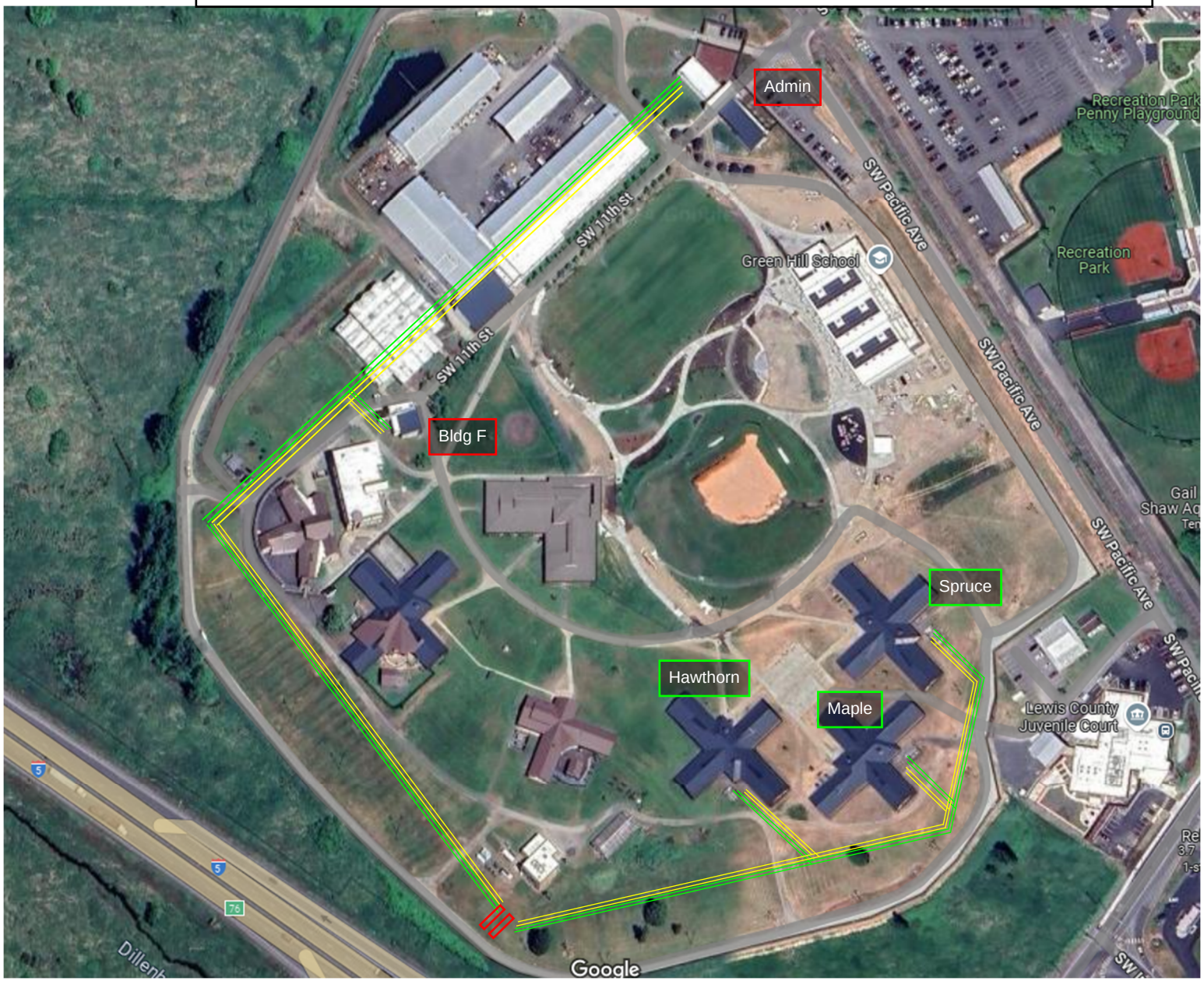
17 REC (2022)

18 CENTRAL PLANT (1981)



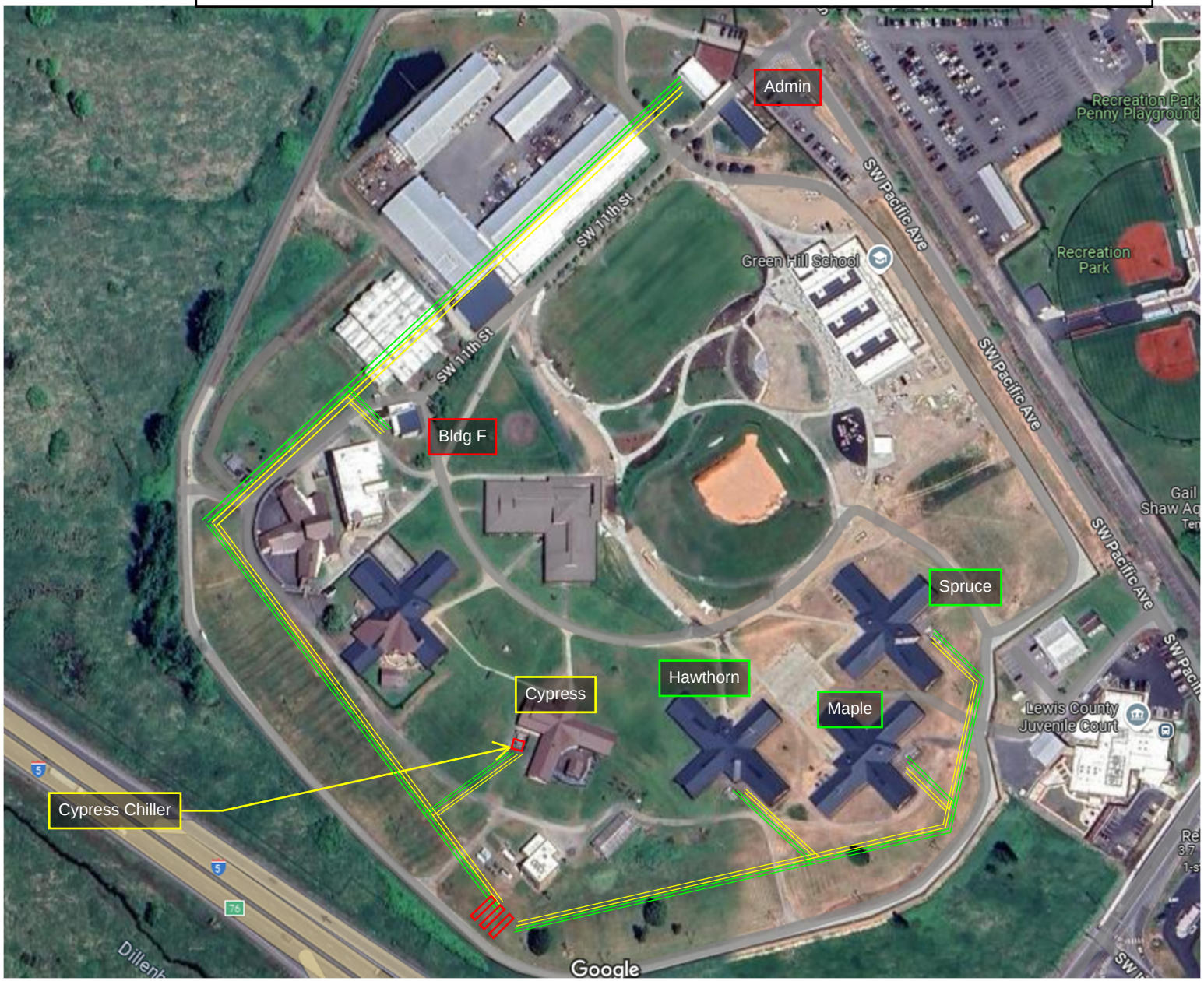
CO2 AWHP, COMBINED HHW/DHW CUP
PHASE 1: 2025-2027

CO2 AWHP, COMBINED HHW/DHW CUP
PHASE 2: 2027-2029

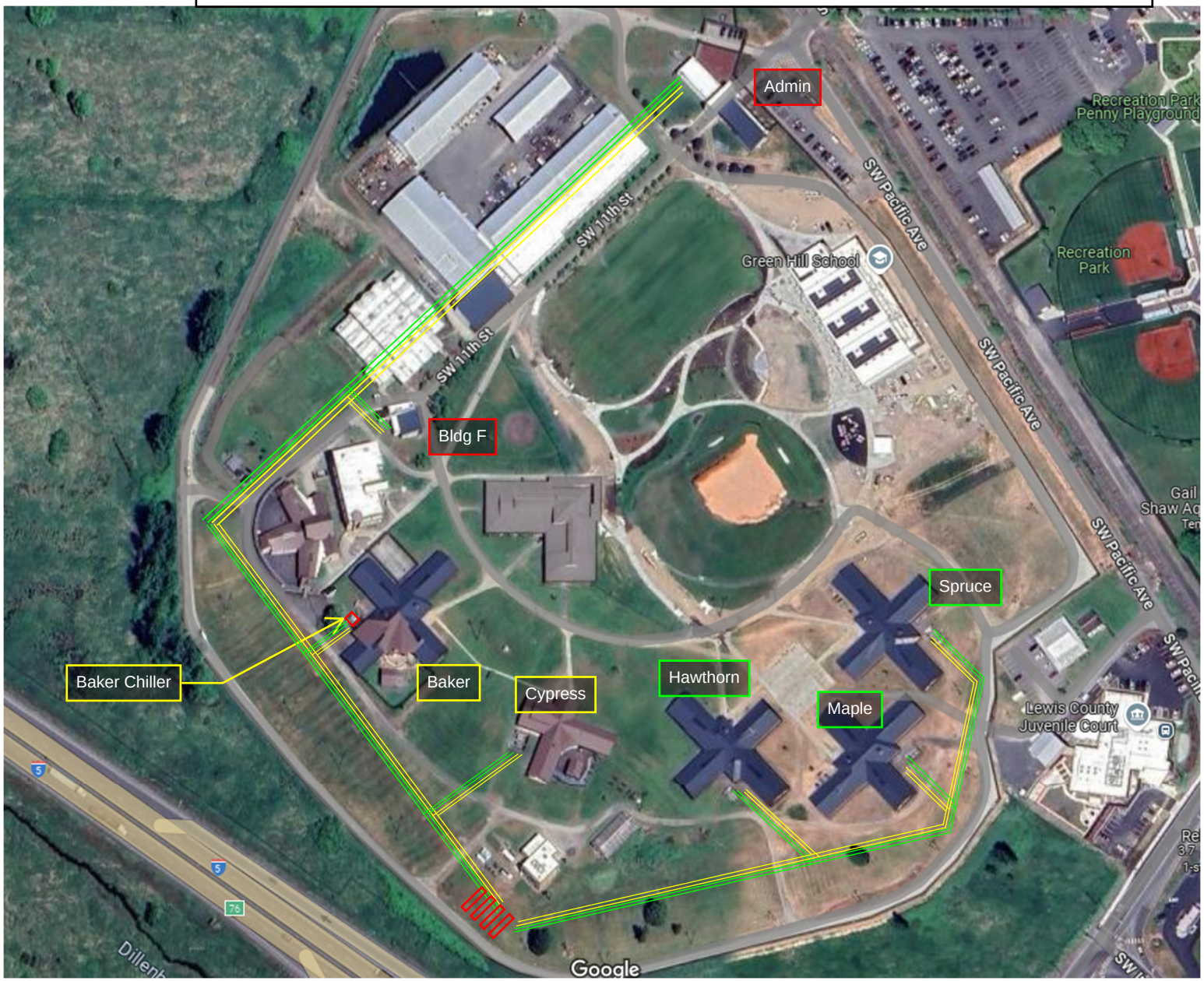


*Assumes Administration size/load doubles

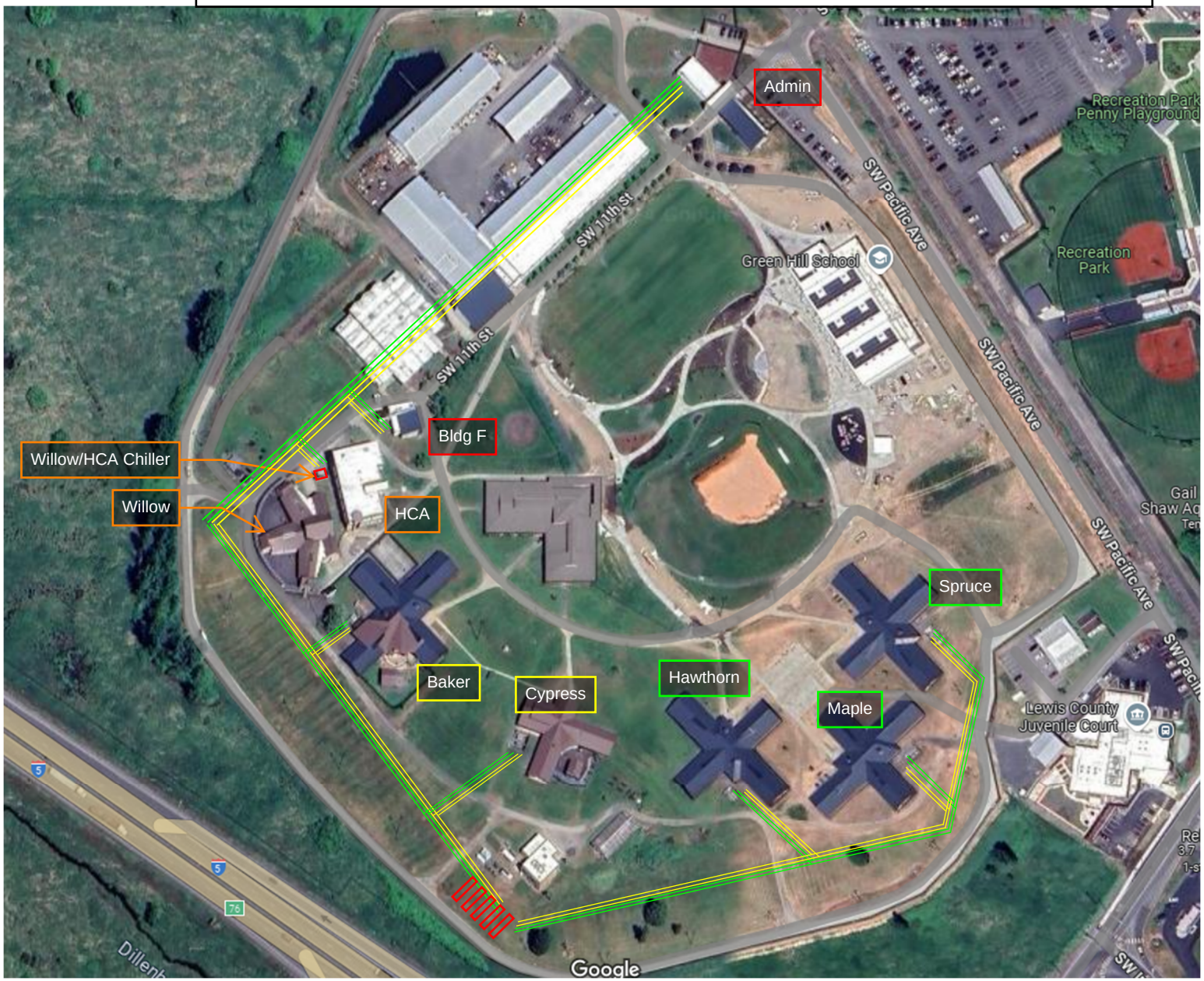
CO2 AWHP, COMBINED HHW/DHW CUP
PHASE 3: 2029-2031



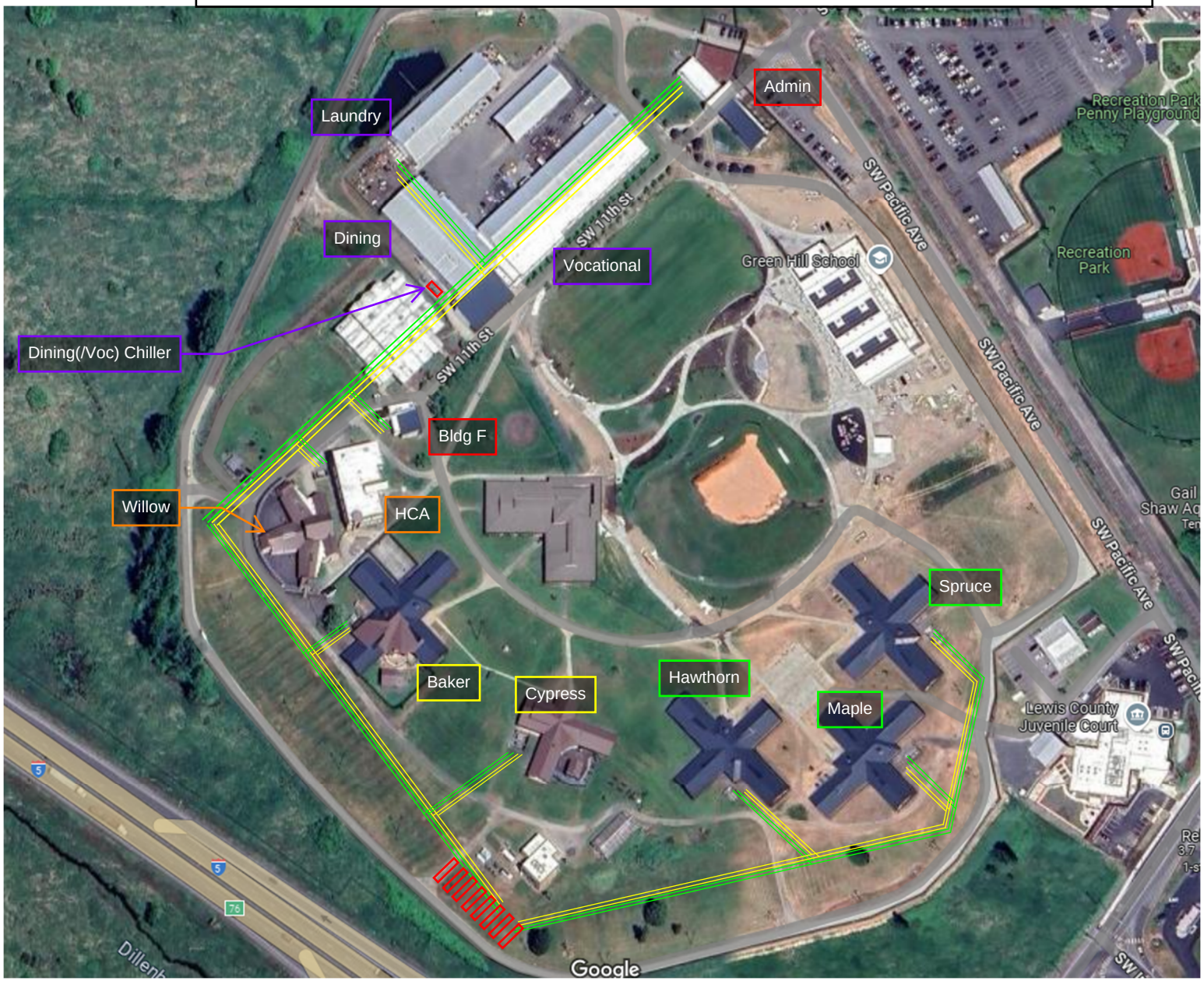
CO2 AWHP, COMBINED HHW/DHW CUP
PHASE 4: 2031-2033



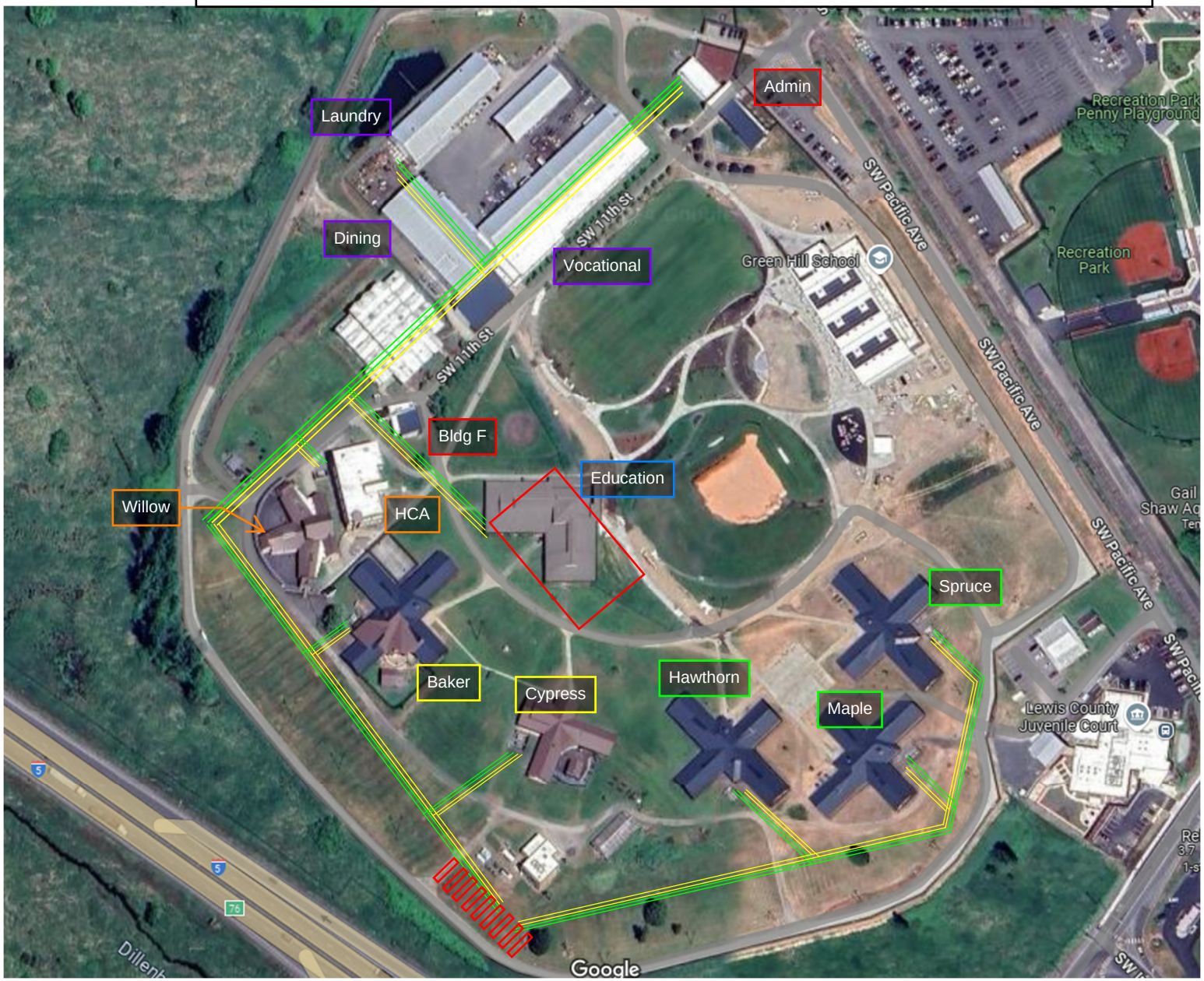
CO2 AWHP, COMBINED HHW/DHW CUP
PHASE 5: 2033-2035



CO2 AWHP, COMBINED HHW/DHW CUP
PHASE 6: 2035-2037



CO2 AWHP, COMBINED HHW/DHW CUP
PHASE 7: 2037-2039



*Assumes Education size increases from ~20k SF to ~30k SF, 100%OA, Energy Recovery

[+]Nat. Gas provides redundancy