State of Utah

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Division of Facilities Construction and Management
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Interim Director

Addendum No. 1

Date:	September 18, 2015
To:	Commissioning Consultants
From:	Taylor Maxfield – Project Manager
Reference:	Westpointe Career and Technical Education Center Salt Lake Community College – Salt Lake City, Utah DFCM Project No. 15106660
Subject:	**Addendum No. 1**

Pages	Addendum Cover Sheet	2	pages
	HPBS Attachments	29	pages
	Total	31	pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

1.1 SCHEDULE CHANGES: There are no Project Schedule changes.

1.2 GENERAL ITEMS: Questions/Answers/Requests

1.2.1 Question: Are there any more specifics on the individual programs with their respective details and quantities. Such as Individual work space "Exhaust Systems" for the Robotics Techs.(soldering), Machinist, Welders, Individual work stations/tables, etc.?
Answer: At this phase of the design we don't have all quantities/specifics identified. The building will likely have a minimum of two central fume hoods in plastics, and machining. There will also be special exhaust requirements/ air handling equipment for the diesel engine dynamometer and also in the welding lab area.

1.2.2 Question: Is there a SLCC Complete Campus Control Center for the controls to be linked to, or will the building have its own individual System Control Center?
Answer: It will be tied into SLCC Johnson Controls Metasys system via the web. So it will stand alone to a degree but will be remotely accessible.

1.2.3 Question: The Project says Cx. for the Mechanical and Electrical. Will there be any commissioning for Division 22 Plumbing – Pumps, etc?
Answer: The DFCM standards indicate that the following systems be commissioned as a minimum:

1. Cooling systems
2. Heating systems
3. Steam systems
4. Air handling systems
5. Smoke controls systems including fans ductwork and interconnected air handling/ supply systems
6. Plumbing systems
7. Emergency power systems
8. On-site renewable energy systems
9. Electrical systems
10. Building Automation Systems (BAS), including verification of correctly installed data points and meters

1.2.4 Question: At the mandatory meeting a question was asked if the "Agency" is SLCC or DFCM in regard to a scoring question?
Answer: The Agency is primarily considered SLCC, but we will also consider the DFCM as well.

1.2.5 Request: Please provide the Appendices for Section 5
Answer: See attached.

HPBS Appendix A - Data Points List

	Input/Outputs						Graphics					Other		
Description of Points	Digital Input	Digital Output	Analog Input	Analog Output	Hardwire Interlock	BAS Communication	Dynamic Flow Diagrams	Start/Stop	Display Status	Display Value	Adjust Value	Alarm Local	Alarm Email	Trend 15min
Air Handlers														
Supply Fan VFD (Points per VFD)	Refer to VFD in the list													
Supply Fan Start/Stop (if not on VFD)		x						x	x	x	x			
Supply Fan Status (if not on VFD)			x				x	x	x	x	x			x
Supply Fan Run Time						x				x				
Calculated kWH from CT from status										x				x
Calculated kW										x				x
Supply Air Static Pressure			x						x	x	x			x
Low Temp Detector (Freeze Stat)	x									x		x	x	x
Pressure Relief Doors	x								x			x		
Pre-Filter Differential Pressure			x							x		x		
Final Filter Differential Pressure			x							x		x		
High Static Pressure Switch	x									x		x		
Low Static Pressure Switch	x									x		x		
Outside Air Damper		x					x			x	x	x		x
Discharge Isolation Damper Status	x									x				x
Discharge Isolation Damper Command		x					x		x					
Return Air Damper		x					x			x	x			x
Supply Air Temperature			x						x	x	x			x
Pre-Heat Coil Discharge Air Temperature			x							x	x			x
Heat Recovery Coil DAT			x							x	x			x
Cooling Coil Valve				x			x			x	x			x
Indirect Cooling Coil Valve				x			x			x	x			x
Pre-Heat Coil Valve				x			x			x	x			x
Heat Recovery Coil Valve				x			x			x	x			x
Heating Coil Valve				x			x			x	x			x
Cooling Coil Discharge Air Temperature			x							x	x			x
Indirect Cooling Coil DAT			x				x			x	x			x
Heating Coil Discharge Air Temperature			x							x	x			x
Evap Media Discharge Air Temperature			x							x	x			x
Evap Media Humidity Sensor			x							x	x			x
Evap Media Pump		x					x	x			x			
Evap Media Status	x						x		x					x
Evap Sump Drain		x								x	x			x
Evao End Switch for Drain	x				x				x					

Evap Sump Fill		x							x		x			x
Evap Sump Flush		x							x		x			
Mixed Air Dampers				x			x			x	x			x
OA Sensor at the AHU (not a general OA sensor)			x							x	x			x
Return Air Tep			x							x				x
Return Ar Humidity			x							x				x
Mixed Air Temp			x							x	x			x
CO2 Return			x							x	x			x
CO2 Outside Sensor			x							x	x			
OA DB			x							x				
OA WB			x							x				
OA Flow Meter			x							x				x
Occupancy									x		x			x
Cooling Load PID (showing stages of cooling)							x			x	x			
Heating Load PID 9showing stages of heating)							x			x	x			
DAT Setpoint										x	x			
Duct Pressure Setpoint										x	x			
Heat Recovery Enable Disable Temp										x	x			
Exhuast Air Handlers														
Ehaust Fan VFD (Points per VFD)	Refer to VFD list													
Fan Start/Stop		x						x	x	x	x			
Fan Status			x				x	x	x	x	x			x
Fan Runtime						x				x				
Fan Inlet High Static Pressure Switch	x								x			x	x	
Ehaust Air Pre-filter Differential Pressure			x							x				
Reclaim Coil Valve		x					x			x	x			x
Reclaim Coil Discharge Air Temp			x							x	x			x
Ehaust Duct Static Pressure			x							x	x			x
Ehaust AirIsolation Damper				x			x		x	x	x			x
Ehaust Air Bypass Damper				x			x			x	x			x
Stack Differential Pressure				x						x	x			x
Exhaust Air Temperature			x							x	x			x
Occupancy									x		x			x
Duct Pressure Setpoint										x	x			
Reclaim Enable/Disable Temp										x	x			
Domestic/Industrial Hot Water Systems														
Pump Enable		x						x		x	x			
Pump Current Transducer			x				x		x					x
Pump Runtime										x	x			
Calculated kWH from CT										x				x
DHW Heater enable		x					x		x		x			x
DHW Heater Fault						x						x		
DHW Heater Additional Point via Manufacturer						x								
DHW Tank Temperature						x				x				x

IHW Heater enable		x					x		x		x			x
IHW Heater Fault						x						x		
IHW Heater Additional Point via Manufacturer						x								
IHW Tank Temperature						x				x				x
Leaving Water Temperature from Tanks			x							x				x
Leaving Water Temperature from MV			x							x				x
Return Water Temperature			x							x				x
Meter for Kitchen System						x				x				x
Water Meter for Domestic Hot Water System						x				x				x
IHW Tank Temp Setpoint										x	x			
DHW Tank Temp Setpoint										x	x			
Building Reheat System														
Pump VFD (Points per VFD)	Refer to VFD													
Reheat Pumps Stop/Start		x						x			x			
Reheat Pumps Status	x						x		x		x			x
Reheat Pump Runtime										x				
Reheat Pump Calculated kWH from CT										x				x
Hot Water Supply Pressure			x							x	x	x		x
Hot Water Return Pressue			x							x	x	x		x
Calcualted DP										x				x
Supply Water Temperature			x							x	x			x
Return Water Temperature			x							x	x			x
System DP Setpoint										x	x			
Low Return Pressure										x		x		
Low Return Pressure Setpoint										x	x			
Glycol Hot Water Loop														
Glycol Supply Temperature			x							x	x			x
Glycol Return Temperature			x							x	x			x
Control Valve				x						x	x			x
Pump Current Transducer			x											
Pump														
Pump Stop/Start		x					x	x		x	x			x
Pump Calculated kWh from CT										x				x
Low Alarm Glycol	x								x			x		
Glycol Tank Pump Status	x								x					x
Glycol Supply Pressure			x							x	x			x
Glycol Return Pressure			x							x	x			x
Calculated DP										x				x
Pressure not needed for small loops														
System DP Setpoint										x	x			
Low Return Pressure										x		x		
Low Return Pressure Setpoint										x	x			

Boiler Hot Water Loop														
Boiler Enable		x								x	x			
Boiler Status	x						x		x	x	x			x
Boiler Alarm										x		x		
Boiler Fail										x		x	x	
Supply Water Temperature (Each Boiler)			x							x	x			x
Return Water Temperature			x							x	x			x
Boiler Pump Enables		x								x	x			
Boiler Pump Current Transducer									x		x			x
Pump Calculated kWh from CT										x				x
Emergency Shutdown Switch (each door)					x					x		x	x	
Modulation Rate						x				x	x			x
Supply Temp Common			x							x	x			x
Runtime						x				x				
Boiler LWT Setpoint						x				x	x			
Chilled Water System														
Pump VFD (Points per VFD)	Refer to VFD													
CHW Pumps Enable		x						x			x			
CHW Pumps Status	x								x		x			x
CHW Supply Pressure			x							x	x			x
CHW Return Pressure			x							x	x			x
CHW Calculated DP										x				x
Chilled Water Supply Temp			x							x	x			x
Chilled Water Return Temp			x							x	x			x
Indirect CW Supply Temp			x							x	x			x
Indirect CW Return Temp			x							x	x			x
Indirect CW Pump Enable		x						x						
Indirect CW Pump Current Transducer			x						x		x			x
Pump Calculated kWh from CT										x				x
CHW DP Setpoint										x	x			
Chillers (Air/Water Cooled)														
CH-1 Enable		x												
CH-1 Status						x								x
CH-1 Fault						x						x		
CH-1 CHWS Supply Temp SP				x						x	x			
Condenser Pressure						x				x				
Evap Pressure						x				x				
Runtimes						x				x				
VFD						x				x				
% Load						x				x				
Fault												x		
KW						x				x				x
KWh						x				x				x
KW/Ton						x				x				
Cooling Towers														

Indirect CW Pump Enable		x						x						
Indirect CW Pump Current Transducer			x						x		x			x
Pump Calculated kWh from CT										x				x
Sump Temperature			x							x	x			
Sump High Level Alarm	x											x		
Low Level Alarm (interlocked with pumps)	x				x							x		
Sump Heater CT			x						x					
Sump Heater Calculated kWH from CT										x				x
Tower Discharge Temperature			x							x	x			x
Tower Fan Enable		x								x	x			
Tower Fan Status	x						x		x					x
Tower Fan VFD Speed Signal (Points per VFD)	Refer to VFD													
Make-up Water Meter	x									x				x
Drain Water Meter	x									x				x
ISS/Chemical Feed														
Status ISS Pump	x													x
Pump Interlocked with CW Pump					x									
Interlock Blow Down Valve with Chemical					x									
Chemical Feed Interlocked with CW Pump					x									
Chemical Feed Micro-Ohms			x							x				
Drain Water Meter	x									x				x
Heat Exchangers														
Source Entering Water Temp			x							x	x			x
Source Leaving Water Temp			x							x	x			x
Load Entering Water Temp			x							x	x			x
Load Leaving Water Temp			x							x	x			x
Load Valve				x						x	x			x
Source Valve				x						x	x			x
Fan Coil Units														
Space temperature			x							x	x			x
Space Temperature SP										x	x			x
UnOccupied Space Temperature Cooling										x	x			
UnOccupied Space Temperature Heating										x	x			
Standby Space Temperature Cooling										x	x			
Standby Space Temperature Heating										x	x			
Supply air temperature			x							x	x			x
Chilled Water Valve				x						x	x			
Hot Water Valve				x						x	x			
Fan Motor Current Sensor			x							x				
Fan Motor Start/Stop		x						x	x					
Fan Calculated kWh from CT										x				x
Filter DP			x											
Water Sensor					x					x		x		
Occupancy	x													

Variable Frequency Drive														
Start/Stop		x						x	x	x	x			
Status	x					x								x
System Fault	x											x	x	
External Fault	x											x	x	
Speed				x		x								x
Frequency Output						x								
Percent Output						x								x
Current						x								
Power (kW)						x								x
Drive Temperature						x						x		
KWH						x								x
Runtime						x								
DC Bus Volts						x								
VAV Terminal Units														
Space Temperature SP										x	x			x
Space Temp			x							x				x
Hot Water Valve				x						x	x			x
AHU DAT						x				x				
Max CFM										x	x			
Min CFM										x	x			
Reheat CFM										x	x			
Damper Postion				x										
Actual CFM			x							x	x			x
Discharge Air Temperature			x							x				x
Occupancy	x									x	x			x
Per cent Load										x				
UnOccupied Space Temperature Cooling										x	x			
UnOccupied Space Temperature Heating										x	x			
Standby Space Temperature Cooling										x	x			
Standby Space Temperature Heating										x	x			
Venturi VAV Tracking Pairs Controls														
Space Temperature Sensor Input			x			x				x	x			x
Occupied Temperature SetPoint Input			x			x				x	x			
Occupancy Override Input	x					x				x	x			
Occupancy Sensor Input	x					x				x	x			x
Application Mode Command Input						x								
Unoccupied Cooling Temperature Setpoint						x				x	x			
Unoccupied Heating Temperature Setpoint						x				x	x			
Discharge Air Temperature Input			x			x				x				x
Terminal Load Output						x				x				
BMS HVAC Emergency Override Input	x					x				x				
Zone Total Supply Flow Output			x			x				x				
Zone Total Ehaust Flow Output			x			x				x				
Zone Volumetric Offset Feedback Output			x			x				x				
Supply Valve Flow Feedback Output			x			x				x				x

Ehaust Valve Flow Feedback Output			x			x				x				x
Reheat Valve				x		x				x				x
Calculated Positive Room Alarm												x		
Fume Hood Labs														
Space Temperature Sensor Input			x			x				x	x			x
Occupied Temperature SetPoint Input			x			x				x	x			x
Unoccupied Cooling Temperature Setpoint						x				x				
Unoccupied Heating Temperature Setpoint						x				x				
Discharge Air Temperature Input			x			x				x				x
Terminal Load Output						x				x				
BMS HVAC Emergency Override Input	x					x						x		
Zone Total Supply Flow Output			x			x				x				
Zone Total Ehaust Flow Output			x			x				x				
Supply Valve Flow Feedback Output			x			x				x				x
Ehaust Valve Flow Feedback Output			x			x				x				x
Reheat Valve				x		x				x	x			x
Flow Alarm						x						x		
Hood Override						x								
Sash Height Alarm						x				x		x		
Face Velocity						x				x				
Sash Open Percent						x				x				x
User Status State						x				x				x
Bypass Time Remain						x				x				
Effective Emergency Mode						x								
Emergency Mode Command						x								
Occupancy	x									x	x			x
BTU Metering														
Gallons per Minute						x				x				x
Entering Water Temperature						x				x				x
Leaving Water Temperature						x				x				x
Instantaneous BTU						x				x				x
Cumalative BTU						x				x				x
Exhuast Fans														
Fan Start/Stop		x						x						
Fan Current Transducer			x						x					x
Calculated kWH from CT										x				x
Motorized Damper		x								x	x			
End Switch	x								x					x
Power Meters (sub meters)														
kW						x				x				x
PF						x				x				x
kWH						x				x				x
Volt (per phase)						x				x				x
Amperage (per phase)						x				x				x

Power Meters (main meter)														
kW						x				x				x
PF						x				x				x
kWH						x				x				x
Volt						x				x				x
Amperage						x				x				x
Total Harmonic Distortion						x				x				x
Compressor & Vacuum Pumps														
Alarm	x								x			x		
Pump Status	x								x					x
Pump Pressure			x							x		x		x
Water Meters														
Building Water Meter	x									x				x
Gas Meters														
Building Meter	x									x				x
Boiler Meter	x									x				x
Water Heater Meters	x									x				x
Unit Heaters/Cabinet Unit Heaters														
Space Temperature														
Space Temperature Setpoint														
Fan Start/Stop														
Fan Status by CT														
Fan kWH calculated by CT														
Automatic Transfer Switches														
Switch Status						x				x				x
Generator														
Status						x				x				x
Running Hours						x				x				x
Low Fuel Level						x				x				x
VRF Systems														
Condensing Unit Status						x				x				x
FCU Status						x				x				x
Mode						x				x	x			x
Setpoint High						x				x	x			
Setpoint Low						x				x	x			
Mode						x				x	x			x
On/Off						x				x	x			
Setpoint Change						x				x	x			x
OA_Damper						x				x	x			x
Space Temperature						x				x	x			x

Division of
Facilities Construction
& Management

Project Energy Performance Statement

Utah DFCM High Performance Building Standard 2014 - Section 5.5

Step 1: Complete all required fields on each sheet, as applicable. Where not applicable, enter "n/a" in required fields. Insert rows, if needed, for complete reporting.

Step 2: Complete a project narrative describing the modeling approach, and any special circumstances or issues related to the project's energy performance. Attach appropriate software output reports.

Step 3: Submit the Project Energy Performance Statement & required supporting documentation (HPBS 2014 Section 5.5(A)(3)(b)) to the Utah DFCM Energy Program Director, for subsequent review and comment.

Version_01 (July 2014)

Appendix C - Life Cycle Cost Worksheet

Life Cycle Cost Analysis (LCCA) is required when the design does not meet the Utah High Performance Building Standard savings requirement. The reason for the LCCA requirement is to confirm and document selected measures or design options have highest net savings or lowest total life cycle costs. This must be documented using methodologies consistent with Federal life-cycle cost methodology and procedures, 10 CFR, part 436, subpart A *Life-Cycle Cost Methodology and Procedures.*

If the building does not meet the HPBS savings requirement, please present a LCCA documenting the selected design achieves the highest net savings or lowest total life cycle cost. Please provide input assumptions and sources as needed. It is recommended that sources and assumption are provided for the following inputs:

- energy costs and savings
- capital costs
- discount rate
- inflation rates for energy, operations and maintenance, and general purchases
- financing rates
- loan terms
- period of analysis
- repair and replacement costs
- annual operations and maintenance costs

All inputs, assumptions and calculations are subject to review and approval. Capital costs shall be clearly documented, sample forms are provided on the next page. *The LCCA methodologies and documentation must comply with* 10 CFR, part 436, subpart A *Life-Cycle Cost Methodology and Procedures.*

Several analysis tools are available to assist in the analysis, including but not limited to:

Building Life-Cycle Cost (BLCC) Program: An economic analysis tool developed by the National Institute of Standards and Technology for the U.S. Department of Energy Federal Energy Management Program (FEMP).

Building for Environmental and Economic Sustainability (BEES): Developed by the NIST (National Institute of Standards and Technology) Engineering Laboratory the tool is based on consensus standards and designed to be practical, flexible, and transparent.

eVALUator: Calculates the lifecycle benefits of investments that improve building design.

User-Friendly BLCC Analysis: This is an Excel spreadsheet version of the LCC analysis in eQUEST.

eQuest: Contains LCC analysis tools

Capital Costs shall be clearly documented for both the baseline and alternative cases. At a minimum provide item, cost source, quantity, and cost per unit for each design option. The following forms may be used as a guideline.

Baseline Option

Item	Source	Qty	Unit Cost	Total
Standard Equipment	Vendor		$	$
Standard Equipment	Vendor		$	$
Installation	Contractor		$	$
Installation	Contractor		$	$
Sales Tax	Utah		6%	$
Commissioning	Commissioning Firm			$
Total				$

Alternative 1

Item	Source	Qty	Unit Cost	Total
Premium Equipment	Vendor		$	$
Premium Equipment	Vendor		$	$
Installation	Contractor		$	$
Installation	Contractor		$	$
Sales Tax	Utah		6%	$
Commissioning	Commissioning Firm			$
Total				$

Alternative 2

Item	Source	Qty	Unit Cost	Total
Premium Equipment	Vendor		$	$
Premium Equipment	Vendor		$	$
Installation	Contractor		$	$
Installation	Contractor		$	$
Sales Tax	Utah		6%	$
Commissioning	Commissioning Firm			$
Total				$

Owners Project Requirements & Basis of Design

The purpose of the OPR is to provide a clear and concise document of the Owner's goals, expectations and requirements for the building. It provides the design team with the information to develop the Basis of Design (BOD) during schematic design, serving as a road map for the development of the design and construction documents. Additionally, OPR and BOD provide the owner and commissioning agent with tangible benchmarks to measure success, quality and confirm that the building and systems constructed align with the Owner's expectations and requirements.

A concise OPR must be developed by the design team and owner during the project programming phase, or by the midpoint of schematic design, for projects without a programming phase. For projects with a programming phase, the OPR is required to be complete and included in the project program. For projects without a programming phase the, the OPR is required to be complete and included in the schematic design review set.

As the project develops, it is expected that many of the elements of the OPR and BOD will evolve. Once the initial OPR and BOD are developed by the design team and the Commissioning Agent (CxA) has been integrated into the project, it is to be reviewed by the CxA at the SD, DD and CD submittal. Changes to the OPR and BOD, from one design phase to the next, must be documented by the design team.

Additionally, the OPR and BOD should serve as a foundation for the projects systems manuals delivered to the Owner as part of the "as-built" documents.

The following sections must be included in the OPR.

- Project information
    - Project name
    - Project site address
    - Building typology
    - Utility bill/account information
        - Rate schedule
        - Meter number (if known)
    - Project team contact information (emails, addresses, phone numbers) per programming and design phase teams
        - Owner Information
            - DFCM Project Manager
            - DFCM Energy Program Director
            - Agency Project Manager
            - Agency Energy Manager
            - Facility Operator - if this is unknown, identify who in the agency will represent the interests of the person(s) who will operate and maintain

the building, through the design and construction period. Identify the date in which the Facility Operator will be known.

- Architect
  - Principle In Charge
  - Project Architect
- Mechanical Engineer
- Electrical Engineer
- Cost Estimator
- Kitchen Designer
- Lighting Engineer
- Civil Engineer
- Landscape Architect
- Other project consultants
- General Contractor
  - Project Executive
  - Project Manager
  - Superintendent
  - Project Engineer
  - Cost Estimator

- Project background
  - General building information including but not limited to the following
    - Square footage
    - Number of floors
    - Construction Costs (soft and hard)
    - Location
    - Design schedule
    - Construction schedule
    - Project delivery method
    - Estimated occupancy
    - Code occupancy schedules
    - Abatement (if necessary)
  - General project background
    - Brief summary of the project
      - Intended use
      - Occupancy
      - Construction type
      - Other
    - Mission
    - Objectives
    - Possible needs for flexibility and expansion
- Code & standards

    - Building codes
    - DFCM standards
    - Agency standards
    - Other
- Building performance
    - See Section 5.0 – High Performance Building Standard, for applicable requirements
        - Context sensitive design
        - Site design
            - Open space
            - Landscape
            - Storm Water
            - Heat Island Reduction
            - Light Pollution
        - Energy performance
            - Performance requirement
            - New Construction vs Major Remodel
            - Energy Model vs Qualitative Energy Engineering
            - Design Build Competitions
            - Life Cycle Cost
                - Identify anticipated energy costs for all sources to project
            - Life cycle expectations
                - General building
                - Building envelop systems
                - HVAC systems
                - Electrical systems
                - Plumbing systems
                - Warranty expectations
            - Equipment performance
            - Controls strategies
            - Economizers
            - Premium efficiency motors
        - Transportation management
            - Parking requirements
            - Alternative parking requirements
            - Alternative transportation provisions
        - Water Efficiency
            - EPA Water Sense Requirement
        - Materials and Resources
            - Recycling
            - Sourcing
        - Indoor environmental quality

            - Air quality measures
            - Views
                - Identify areas in the space program to have visual access to the outdoors.
            - Daylighting
            - Outside air
            - Ventilation
            - Lighting levels
            - Occupancy sensor for lighting and thermal controls
            - Filtration
            - Building flush
            - VOCs
        - Education and Outreach Program
        - Building envelope
            - See Section 5.13 – Envelope Commissioning
            - Internal, external and thermal loads in conjunction with mechanical and electrical criteria
            - Façade
            - Fenestration
            - Assemblies
            - Roof
            - Subgrade
            - Warranty expectations
        - Incentives and Rebates
            - Identify rate schedules
            - Identify utility providers
            - Identify anticipated energy costs for all sources
            - Include final incentive documentation in final OPR and O&M manuals
- Spaces program
    - Occupancy schedules
        - Daily on a weekly and monthly basis per space program
        - Consider weekend uses and summer uses for educational projects
    - After hours schedules
    - Cleaning schedules
    - Set points
- Architectural criteria
    - Identify unique design features that may impact building performance
        - Atriums
            - Smoke Evacuation expectations
            - VFD's for supply and exhaust fans
            - Code requirements for controls, testing and detection

        - Clerestory
        - Mixed occupancies
        - Interior garages
        - Kitchens
        - Tunnels
        - Bridges
        - Future expansions
- Electrical & Lighting criteria - per space program
    - Per space program
    - Light power density (LPD)
    - Foot-candle levels
    - Controls
    - Remote BMS access needs, notifications and clearances
    - Occupant controls
    - Controls interface requirements
    - Lighting strategies
        - Task
        - Ambient
        - Emergency
        - Daylighting & outdoor views
    - Special requirements
    - Exterior requirements
    - Emergency requirements
    - UPS
    - Distribution
    - Metering
    - Equipment types
    - Power quality control
    - Peak demand control
    - Redundancy requirements
    - Warranty expectations
    - Identify internal, external and thermal loads
- Mechanical criteria - per space program
    - Design conditions for summer and winter including tolerances
    - Acoustical isolation criteria
    - Pressurization
    - Ventilation
    - Humidity
    - Passive strategies
    - Zoning
    - Controls
    - Remote BMS access needs, notifications and clearances

    - Occupant controls
    - User interface requirements
    - Metering
    - Analytics
    - Equipment types
    - Refrigeration needs
    - Domestic hot water
    - Peak demand control
    - Redundancy requirements
    - Warranty expectations
    - Identify internal, external and thermal loads
- BAS/BMS requirements
    - Accessibility
    - Type
    - Integration
    - Metering, see Section 5.10 - Metering
    - Points, see Section 5.11 – Data Points
- Security requirements
- Audio Visual requirements
- Integration into existing campus infrastructure systems
    - Consult campus hydraulic flow analysis
    - Consider capacity
    - Diversity
    - Identify possible campus infrastructure implications
        - Electrical distribution systems
        - Building heating and cooling distribution systems
        - Interface with existing BMS and controls systems
        - Add meters when possible to existing systems to further energy management efforts on older systems
    - Identify existing campus systems performance levels
        - Provide existing energy performance data
        - Metering levels of existing systems related to the project
        - Clarify billing arrangements of building tenants
    - Identify opportunities for renewables or site based resources
        - Solar
        - Wind
        - Ground source
        - Water wells
        - Other
- Greenhouse Gas Emissions performance implications

    - If applicable or requested by the owner identify GHG reporting requirements and tracking metrics.
        - Carbon dioxide – CO2
        - Methane – CH4
        - Nitrous Oxide – N2O
    - Track throughout the design process
    - Identify direct emissions contributors
    - Identify indirect emissions contributors
- Renewable systems
    - LCC considerations
    - Offsite generation considerations
    - Onsite generation considerations
    - Alternative and additional financing mechanisms
        - Power Purchase Agreement
        - Donor funds
        - Student fees
        - Agency funding
        - Grants and incentives
    - Renewable Energy Certificates
- LEED Requirements
- Acoustical criteria
    - Per space program
    - Internal considerations
    - External considerations
- General systems to be commissioned. With the Facilities Operator identify which systems and which equipment is to be commissioned as well as the commission scope
    - See Section 5.12 – Commissioning
    - See Section 5.13 – Building Envelop Commissioning
    - HVAC
    - Electrical
    - Controls
    - Lighting Controls
    - Life Safety
    - Security
    - Plumbing
    - Elevator
    - Equipment
    - Telecom
    - Remote BMS access needs and clearances
- Post-occupancy and warranty
    - 5 Month Walk Through Meeting

        - Onsite meeting five to six months after Substantial Completion to review performance and quality of the facility with the following in attendance (minimum)
            - Facility Operators
            - Agency Energy Manager or DFCM Energy Program Director
            - Commissioning Agent
            - Mechanical Engineer
            - General Contractor
            - Mechanical Subcontractor
            - Architect
            - User Representative
    - 10 Month Walk Through Meeting
        - Onsite meeting 10 months after Substantial Completion to review warranty, performance and quality issues with the following in attendance (minimum)
            - Facility Operators
            - Agency Energy Manager or DFCM Energy Program Director
            - Commissioning Agent
            - Mechanical Engineer
            - General Contractor
            - Mechanical Subcontractor
            - Architect
- Operations and maintenance
    - Benchmarking requirements per ENERGY STAR Portfolio Manager
    - Requirements and expectations by Facility Operators
        - Training
            - HVAC systems
            - BMS & Controls
            - Electrical systems
            - Lighting systems
            - Security systems
            - Identify who is to be trained
            - Number of training sessions
            - Follow up training sessions
            - Other as deemed necessary by Facility Operators and Owner
        - Systems Manuals
            - As-Builts
            - Single line schematics
            - Controls As-Built
                - Drawings
                - Sequences
                - Set points

            - Recalibration schedule
        - OPR
        - BOD
        - Commissioning functional test reports
        - Must be organized, electronic and searchable
        - Other as deemed necessary by Facility Operators and Owner
    - Preventative maintenance program expectations
        - Recommended re-commissioning schedule
        - Attic Stock expectations
    - Education and Outreach Program, see Section 5.9 – Education and Outreach Program
- Building occupant expectations
    - Additional areas beyond areas previously discussed in the OPR
- Possible behavioral implications of HPBS goals and strategies
    - Occupants role in energy efficiency and sustainability
    - Facilities operators role in energy efficiency and sustainability
- Budget considerations
    - Balance efficiency, quality, budget, comfort and maintenance
- Specific building typology requirements must be developed during programming in conjunction with the design team, Authority Having Jurisdiction, specialized design consultants, building occupants, and commissioning agent
    - Labs
    - Vivarium
    - Courthouses
    - Acute care hospitals
    - BioSaftey Level (1,2,3) type facilities
    - Prisons and Jails
    - Libraries
    - Museums
    - Data Centers
    - Others as necessary

5.0 Appendices

A. Data Points List – Section 5.11
B. Energy Modeling Spreadsheet – Section 5.5
C. Life Cycle Cost Worksheet – Section 5.5
D. HPBS Sustainability Worksheet – Section 5.6, 5.7, 5.8, 5.
E. HPBS Workshop Suggested Agenda – Section 5.1
F. OPR Required Sections – Section 5.15
G. Envelope Commissioning Matrix – Section 5.13
H. Incentives and Rebates Process Guidelines – Section 5.14
I. Incentives and Rebates Responsibility Matrix – Section 5.14

High Performance Building Standard – Incentives & Rebates Section

Both Rocky Mountain Power (RMP) and Questar Gas (QG) have cash incentives available to building owners for the installation of energy efficient equipment and systems in New Construction Projects. It is DFCM's intent to obtain, in a timely manner, all possible gas and electric utility incentives/rebates for the *prescriptive or typical* measures included in their new building projects. *Prescriptive* energy efficiency measures are defined as those that propose equipment/systems that exceed existing building energy code and have incentives or rebates paid based on the type, size, and quantities of high efficiency equipment installed.

Custom energy efficiency measures (EEMs), which require supporting engineering calculations to quantify energy savings, are to be identified and handled by the design team by reporting them, as soon as they are identified, to the DFCM Energy Program Director who will coordinate with the proper utility (Questar Gas or Rocky Mountain Power). The utilities will then hire independent consultants to quantify the savings and available incentives for those custom measures. Some examples of custom measures are:

1) Rocky Mountain Power
    a. Capital measures (NC, $.015/kWh saved, 70% project cost cap, 1-year SPB cap)
        i. Lighting – even if you don't meet -10% to Code
        ii. High efficiency chillers (non-HVAC)
        iii. Water side economizers
        iv. Precoolers (evap coolers for air entering air cooled chillers)
        v. Air/Air heat recovery (where not required by Code)
        vi. Economizers for data centers or data rooms
        vii. VFDs where not required by Code
        viii. DCV in parking garages
        ix. Evaporative cooling, not covered by prescriptive measures
    b. Energy Management measures (must exceed Code or industry standard practice)
        i. Equipment Scheduling and night setback controls
        ii. Chiller sequencing
        iii. Condenser water reset
        iv. Night cool down strategies
2) Questar Gas (GS rate schedule only)
    a. Simplified analyses (NC, $1.00/ therm saved, 50% of eligible cost cap)
        i. Boiler controls
        ii. ERVs
        iii. Pipe insulation
    b. Custom Measures (NC, $1.00/ therm saved, 50% of eligible cost cap)
        i. Hot water heat recovery off refrigerant condensers, etc.
        ii. Combustion air preheat for boilers
        iii. Make-up water preheat for boilers
        iv. Air to air heat recovery (where not required by Code)

v. Solar hot water heating
vi. Energy management control upgrades (must exceed Code or industry standard practice

Custom measures are not further addressed in this Section.

New Building Design team members are required to become participants in Rocky Mountain Power's Energy Efficiency Alliance Program. Please note key information about that Program below:

1) It is free to join, it simply requires an application to be filled out
2) A firm only needs to join once to be active participants in all future design projects
3) Participation allows the design teams to use the utilities' available tools to automatically determine energy savings, economic payback and incentives for prescriptive energy conservation measures. These tools can be useful to the design team in choosing the best energy efficiency alternatives.
4) The (RMP) tools *automatically* generate applications for available incentives from the utilities
5) Companies become EEA Participants to streamline the incentive process and get the full *benefit* of the tools

The efforts outlined in this section do not replace or supersede DFCMs High Performance Building Standards (HPBS). The energy requirements and protocols outlined within the HPBS are in addition to those outlined here-in. The purpose of this section is strictly to address and maximize the acquisition of financial rebates for energy efficiency upgrades from the local utility programs.

Before beginning on design efforts for new facilities, the design team should review the following list, which is a comprehensive summary of all systems/equipment that are currently eligible for incentives from the gas and electric utility companies (Rocky Mountain Power = RMP, Questar Gas = QG). DFCM expects the installation of these systems/equipment to be incorporated into their new building designs where appropriate, unless it *can be shown* that they are not energy life cycle cost effective (as defined in the Energy Section). Equipment required by the current Code is not available for incentives.

1. Envelope
    a. Window film (RMP incentives)
    b. Cool roof (RMP incentives)
    c. Increased wall/roof Insulation (both Questar and RMP have requirements)
    d. High efficiency windows (both Questar and RMP have requirements)

2. Electric HVAC (RMP incentives)
    a. Unitary HVAC, heat pumps
    b. High efficiency chillers
    c. IDEC and evaporative cooling systems
    d. VFD air compressors

    e. Electrically commutated motors
    f. HVAC pump VFDs
    g. HVAC fan VFDs
    h. High efficiency PTAC/PTHP
    i. High efficiency AC
    j. Evaporative coolers
    k. Programmable thermostats (365 day for portable classrooms)
    l. Occupancy based PTHP/PTAC controls
3. GAS HVAC (QG incentives)
    a. Outside air temperature based reset controls (where not req'd by Code)
    b. Gas burning HVAC (unit heaters, infrared heaters, furnaces, boilers)
4. GAS water heating equipment (QG)
    a. Gas fired water heaters
    b. Storage type
    c. Tankless
    d. Condensing
    e. Hybrid gas storage
    f. Direct contact water heaters
5. Kitchen equipment
    a. Efficient *electric* cooking equipment (RMP)
        i. Steam cooker
        ii. Convection oven
        iii. Combination oven
        iv. Commercial fryer
    b. Other efficient electric food service equipment (RMP)
        i. Commercial Dishwasher
        ii. Insulated holding cabinet
        iii. Ice machines (air cooled)
        iv. Residential dishwasher or refrigerator used in business
        v. Efficient commercial refrigerator/freezer/cases
        vi. Glass door refrigerator
        vii. Glass door freezer
        viii. Solid door refrigerator
        ix. Solid door freezer
        x. High efficiency beverage vending machine
        xi. LED case lighting
        xii. Refrigerated case occupancy sensor
    c. Efficient *gas burning* cooking equipment (QG)
        i. Commercial Fryer
        ii. Steam cooker
        iii. Convection Oven
        iv. Griddle

        v. High efficiency pre-rinse spray valve (dishwasher)

6. Lighting (RMP)
    a. Interior lighting
    b. Exterior Lighting
    c. Induction fixtures
    d. LED outdoor area and roadway fixtures
    e. CFL wall packs
    f. Lighting controls

Nexant (Salt Lake City office) and Evergreen Consulting Group serve as the utilities' Outreach Teams, and as such are available to assist with questions on the incentive process and what equipment specifically does/does not qualify. While these firms serve as a resource to assist the design team when they have questions, they do not have the responsibility of obtaining incentives. The responsibility for obtaining incentives lies with the owner and those hired by the owner (in this case the Project Design Team).

Refer to the Energy Efficiency Alliance link for all the forms, resources, applications, program information, and other resources for additional information for both lighting and non-lighting projects. http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jspx/Home.jspx

More specifics on prescriptive utility incentives can be found at the following web sites http://www.thermwise.com/business/BusinessRebateApplications.php http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jspx/Forms.jspx

The outline below, and Appendix X provided (Roles and Responsibilities), provide a road map for how the project's *prescriptive* measure incentives are to be obtained. Deviations from the process outlined below must be approved by DFCMs Energy Program Director. This outline defines roles and responsibilities for design team members as well the Commissioning Agent, who will ultimately gather the final equipment submittal data needed to complete the incentive procurement process.

1. **Design Phase**
    a. Architect
        i. Architect is the point of contact to reach the new building owner
            1. Obtains all owner and project identification information needed
                a. Project name
                b. Contact name
                c. Phone
                d. Email address
                e. Project site address
                f. Type of business
                g. Utility bill/account info (rate schedule, meter number if known)
                h. Project contact names and contact info for:
                i. Architect

ii. Mechanical Engineer
iii. Electrical Engineer
iv. Kitchen Designer
v. Lighting Engineer
vi. General Contractor
1. Project Manager
vii. Commissioning Agent

2. Provides this information to Nexant Outreach tradeoutreach@nexant.com
   a. Nexant Outreach then emails rate schedule information to all design teams (for use in utility provided tools).
3. Obtains or coordinates acquisition of all the information required on the Q*uestar ThermWise Rebate Application and the RMP wattsmart Business General Application Forms*

http://www.thermwise.com/business/BusinessRebateApplications.php
http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jspx/Forms.jspx

   a. Architect gets information and fills out forms and gets Owner signatures
   b. At project completion, architect sends *completed* forms to Nexant Outreach

ii. Architect is ultimately responsible for the design team performing their assigned tasks.
   1. Architect and Nexant Outreach will be in contact with respect to progress and problems encountered in the rebate processing process

iii. Identify all additional features of the new building that are prescriptive measures eligible for incentives
   1. See Responsibility column, designation A, Appendix Y, (Project EEMs Incentive/Rebate Summary table).

iv. If available prescriptive measures are *not* incorporated into the design, be prepared to show why they are not life-cycle cost effective, per HPBS Section 5.5, or why they do not meet owners design intent.

v. Provide COMcheck for the new building envelope features to Nexant Outreach

vi. Gather information from design teams and provide a compiled list of *all* prescriptive measures incorporated into the new building design to Nexant Outreach, the DFCM Energy Program Director and the Commissioning Agent.

b. Mechanical Designer
   i. Fill out RMP provided tools for all prescriptive measures in the project involving potential incentives
      1. See Appendix Y, measures with a “Yes” in column 3.

ii. Utilize economic data provided by these tools in the design decision making process
iii. If prescriptive measures are not incorporated into the design, be prepared to show why they are not life-cycle cost effective, per HPBS Section 5.5, or why they do not meet owners design intent.
iv. Utilize tool features to *automatically* produce an RMP incentive application and submit to Nexant Outreach
v. Identify all additional prescriptive measures in the project (*not* requiring tools to be filled out).
    1. See Responsibility column, designation M, Appendix Y, (Project EEMs Incentive/Rebate Summary table).
vi. Provide to the architect information on all mechanical prescriptive measures incorporated into the new facility design by completing all appropriate columns in Appendix Y provided.
vii. Provide mechanical equipment schedule drawings to Nexant Outreach

c. Kitchen Designer (where applicable)
    i. Identify all prescriptive kitchen equipment measures in the project
        1. See Responsibility column, designation K, Appendix Y, (Project EEMs Incentive/Rebate Summary table).
    ii. Provide to the architect information on all kitchen/cooking equipment prescriptive measures incorporated into the new facility design by completing all appropriate columns in Appendix Y provided.
    iii. If prescriptive kitchen equipment measures are not incorporated into the design, be prepared to document why they are not life-cycle cost effective, per Section 5.5, or why they do not meet owners design intent.
    iv. Provide kitchen equipment schedule drawings to Nexant Outreach

d. Electrical designer
    i. Fill out RMP Lighting Tool for all qualifying lighting fixtures
        1. Insure proposed lighting power density beats Code by at least 10%
    ii. Utilize economic data provided by tools in the design decision making process Utilize tool features to *automatically* produce an incentive application and submit to Evergreen Consulting Group (http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jspx/Forms.jspx
    iii. If prescriptive lighting measures are not incorporated into the design, be prepared to document why they are not energy life-cycle cost effective, per section 5.5, or why they do not meet owners design intent.
    iv. Identify all additional qualifying prescriptive lighting measures in the project (*not* requiring tools to be filled out)
        1. Exterior Lighting

a. Induction fixtures
b. LED outdoor area and roadway fixtures
c. CFL wall packs
d. Lighting controls

v. Provide a list of all exterior lighting typical measures to Evergreen Lighting Outreach
vi. Notify the Architect that the project incorporates new or retrofit prescriptive lighting measures.
vii. Provide COMcheck for Lighting to Evergreen Consulting Group http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jspx/Forms.jspx
viii. Provide lighting schedules from drawings to Evergreen Lighting Outreach

2. Construction Phase

a. Nexant Outreach
   i. Keep architect informed of progress and problems in the incentive acquisition process with respect to anything missing from the *design* phase.
      1. In kind, the architect should keep Nexant Outreach informed of any design changes, such as EEMs/equipment that were removed or altered during the value engineering process
   ii. Coordinate with CA to facilitate the final stages of incentive processing.
   iii. Pursue all AHRI Certificates as necessary once final equipment submittals are accepted and provided.

b. Commissioning Agent (CxA)
   i. Oversight of the final incentive process flow of information from subcontractors and General Contractor to Nexant Outreach
      1. Reports to Owner problems encountered in getting information.
   ii. Gathering of all final submittal data, primarily cut sheets on approved equipment, for all prescriptive measures intended for incentives (based on compiled Appendix Y received from Architect). This information will be provided to Nexant Outreach for final rebate processing.
   iii. Timeline requirement – Provide above information to Nexant Outreach within 2 weeks of final equipment submittal approvals.
   iv. Specific Submittal Requirements (which CxA must filter from all the project submittals)
      1. Note: Measures that are required by Code are not eligible for rebates through Rocky Mountain Power or Questar Gas
      2. Nexant will send Appendix Z to the CxA, which includes all the submittal requirements for each type of measure. Along with the information provided to the CA in Section 2bii. above, this will be used by the CA to glean the needed information out of all the project submittals.

3. Only required submittal information is to be passed over to Nexant Outreach by the CxA. Providing unsorted, unorganized or irrelevant project submittals to Nexant Outreach *is not acceptable*. One or two cut sheets per implemented measure is usually all that is needed to verify energy efficient equipment meets program requirements.

3. Closeout

a. Once Nexant and Evergreen Outreach teams have received all the required applications (from design team) and measure specific submittal information (from the Commissioning Agent), they will complete final rebate/incentive processing for all available Questar Gas and Rocky Mountain Power incentives.
b. Architect to provide complete and updated Appendix Y for the project to DFCM Energy Program Director.
c. Nexant Outreach approves the process as complete, (this is a *prerequisite for final retainage payment to be made to the Design Team and CA for services provided*).

HPBS Appendix I - Incentives and Rebates Responsibility Matrix

Incentive Process Task	Owner	Architect	Mechanical Design	Kitchen Design	Electrical Design	Commissioning Agent	Evergreen Lighting Outreach (1)	Nexant Outreach Team (1)
Getting necessary information from Owner for Applications and Agreements		x						
Signing General Applications	x							
Become EEA Participants (required)		x	x	x	x			x
Ultimate responsibility for insuring the various design disciplines perform their assigned tasks		x						
Responsible parties assigned per discipline, firm or organization		x						x
Keeps Architect appraised of progress of incentive processing								x
Fill out RMP tools for any prescriptive measures involving the *building envelope* that have tools		x						
Envelope tools automatically create applications for incentives, send these to Nexant Outreach Team		x						x
Identify all features of the *building envelope* that are eligible for prescriptive incentives (no tools req'd)		x						
Get list of all envelope prescriptive measures to Nexant Outreach Team		x						
Get COMcheck for envelope to Nexant Outreach Team		x						
Fill out RMP tools for all prescriptive measures involving *mechanical systems* that have tools			x					
Mechanical tools automatically create applications for incentives, send these to Nexant Outreach Team			x					x
Identify all *mechanical* systems (gas and electric) that are eligible for prescriptive incentives (no tools req'd)			x					
Get list of all mechanical prescriptive measures to Nexant Outreach Team			x					
Get Mechanical equipment schedule drawing to Nexant Outreach Team			x					
Identify all *Kitchen equipment* (gas and electric) that is eligible for prescriptive incentives (no tools req'd)				x				
Get list of all kitchen prescriptive measures to Nexant Outreach Team				x				
Fill out RMP tools for all prescriptive measures involving *lighting systems* that have tools					x		x	
Lighting tools automatically create applications for incentives, submit these to Evergreen Outreach Team					x		x	
Identify all *lighting* that is eligible for prescriptive incentives (no tools req'd)					x		x	
Get list of all lighting prescriptive measures to Evergreen Outreach					x			
Get COMcheck for lighting to Evergreen Outreach					x			
Evergreen Outreach should share *lighting* measures included in the project with Nexant Outreach for tracking							x	x
A compiled list of all prescriptive measures in the project is provided by Nexant to the Commissioning Agent								x
Gather all final submittal data needed by Nexant Outreach Team (Envelope, mechanical, kitchen and electrical)						x		
Deliver all final submittal data to Nexant Outreach team						x		
Obtain AHRI certificates where applicable								x
Incentives for PC management, smart plug strips, laundry machines and other appliances	x							

Notes: (1) please go to http://rockymountainpower.energyefficiencyalliance.net/tradeally/TA/RMP/jspx/Forms.jspx

design phase

construction phase