ALBERTA INFRASTRUCTURE

EMCS GUIDELINE FOR

LOGICAL POINT MNEMONICS

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Alberta Infrastructure EMCS Standard for Logical Point Mnemonics

1.0 INTRODUCTION

1.1 Definition: Logical Point Mnemonic

An alphanumeric string (name) that is used by the control system to reference any physical attached end device (actuator/sensor etc.) as well as virtual (non-physical) points such as setpoints. The combination of letters and numbers is chosen so as to help one remember the function of the particular point.

1.2 Simple, obvious operation is the key to any successful energy management control system (EMCS). Much of the ease of use is dependent upon the simplicity and consistency of the names chosen to represent the attached sensors and actuators. A balance must be struck between the difficulties associated with always having to key in very long but descriptive names, and the convenience of using a short but more cryptic mnemonic.

1.3 When systems are installed, a significant amount of time is used in the creation of the database and control sequences. Much time is spent later in the fine tuning of the sequences. All this activity necessitates a mnemonic scheme which does not hamper the operator in the understanding of the programmed strategies.

1.4 Most systems offer graphic packages which reduce much of the tedious keyboard entry. At first glance this could imply that there is little need to pay attention to the length of point names. Unfortunately the graphics, however easy to use, must be configured and maintained by someone. In many instances that person is the building operator. Since most operators are chosen for their HVAC/operations knowledge not their keyboarding skills, it is still important to strike a suitable balance.

1.5 A universally applicable scheme is desirable in order to allow operators from various facilities to easily exchange control strategies. Such a standard also decreases the difficulties of staff migration and enables support staff to more easily assist the various areas.

1.6 The purpose of a building control system is to continuously monitor various physical properties and manipulate mechanical devices so as to maintain the desired conditions as determined by the programming. The desired conditions are often indicated by virtual set points relating to the physical property under control. Since all this activity relates to actual physical equipment, it is only reasonable that the mnemonic standard be based on this equipment, not the inner workings of the controller. The name should answer the following questions:

1) What building (only for multi-building site)?
2) What mechanical system ?
3) What zone if terminal equipment is associated with the system?
4) What end device (i.e. valve, damper, sensor)?
5) Does the function of the point require some special emphasis?

1.7 The questions above indicate a three or four level logical point mnemonic and, for some points, an appended fifth level function indicator or attribute.

Level 1: Provides information as to what building contains the point. This level is not required for the usual single building installations.

Level 2: Specifies the mechanical system to which the point is associated.

Level 3: Specifies the point directly associated with the mechanical system described by the level 2 mnemonic.

1.8 There are many cases where the point is not directly associated with the mechanical system described by the level 2 mnemonic, such as in the case of terminal control units that service additional equipment associated with the main system. An example of this is a variable volume air system and its affiliated VAV box controllers.

If the point is connected to terminal equipment affiliated with the system, described by the level 2 mnemonic, then the level 3 mnemonic would describe the type of terminal controller and its location. Level 4 would then be required to specify the point.

Level 3: Specifies the terminal equipment associated with the mechanical system described by the level 2 mnemonic.

Level 4: Specifies the point associated with the terminal equipment described by the level 3 mnemonic.

1.9 If the point represents some associated function with respect to another point or to the system as a whole then an attribute indicator is appended to the previous levels. A separating delimiter is mandatory.

Attribute: Specifies the special function of a physical or virtual point.

1.10 All of the above levels need not be present in a point name. A point name may be composed of as little as two levels; system and point.

2.0 PHYSICAL POINTS - SPECIFICS

2.1 The logical point mnemonic is to be an alphanumeric code composed of three levels if the point is directly associated with the mechanical system.

BUILDING This level is used only if more than one building is under the control of a single EMCS. A one or two character abbreviation is used to designate each building within the system. Examples:

BB	Bowker Building
HB	Haultain Building
PW	Pedway

SYSTEM This level uses a two character mnemonic to break out the major mechanical systems within the facility. A third character is allowed, but not required, in order to enable like systems to be separated. Examples:

AH1	Air Handler 1
VVS	Variable air Volume system South

POINT This level uses a three to four character mnemonic to describe the actual point that is to be controlled. The fourth character is allowed in order to enable the separation of multiple like final control elements or sensors. The additional character is also used in more complex systems where there are many points on a piece of equipment such as a boiler. Examples:

MAT	Mixed Air Temperature
CCV	Cooling Coil Valve
BSP	Branch Static Pressure (if only one)
BSP2	Branch Static Pressure 2
B3HF	Boiler 3 High Fire
B2FF	Boiler 2 Flame Fail

2.2 The logical point mnemonic will need to be an alphanumeric code composed of four levels if the point is connected to a terminal controller or other associated piece of equipment affiliated with the mechanical system.

BUILDING As above.

SYSTEM As above.

TERMINAL UNIT — This level uses a single character mnemonic to indicate the type of terminal unit (B for Box, etc) followed by up to three characters which are used to separate the units. Examples:

B216 - Box for room 216

TERMINAL POINT — This level uses a 1 to 3 character mnemonic to describe the actual point that is to be controlled. These mnemonics follow the same convention as for other point names. Examples:

C	Compressor in heat pump unit
CCV	Cooling Coil Valve in induction units
D	Damper in dual duct or VAV unit
F	Fan in fan powered units
HCV	Heating Coil Valve in induction units
PRV	Perimeter Radiation Valve
RCV	Reheat Coil Valve in terminal reheat units
RPV	Radiant Panel Valve
RV	Reversing valve in heat pump unit
SAF	Supply Air Flow rate of VAV unit
SAT	Supply Air Temperature of terminal unit
ST	Space temperature
V	Valve (miscellaneous functions)

2.3 For physical points, appending attributes are most often used to clarify the intended function of the point such as in the naming of status points. Special purpose transducers, where the output cannot be ranged to a proper engineering unit without going through a program, require an appending attribute as well. Example: If AH1SAF is to be the mnemonic for the final calibrated supply air flow rate, then the actual non-linear or uncalibrated physical input point would be named AH1SAF-T. Common attributes:

A	Amps - motor or device current from current transducer or drive output.
E	Enable - a point that allows a piece of equipment to run under the control of some hardwired local device or its packaged controls.
F	Fault - fault alarm from variable speed drive or packaged controller
O	Override – device override or local controls override status.
S	Status - device status from packaged controller or motor status from differential pressure or current switch etc.
R	Reset - setpoint reset to packaged controller (control point adjust).
T	Transducer - general nonlinear, uncalibrated or special purpose input.

A delimiter is mandatory so as not to cause confusion with other point mnemonics. For example: AH1SFS Is this supply fan status or supply fan speed ?
The delimiter can be any allowed non-alphanumeric character, but the use of a minus sign "-" or an underscore "_" is highly recommended. If these are not allowed then the forward slash "/" has been found to be an acceptable alternate.

2.4 The complete logical point mnemonic is formed by combining all levels sequentially. Examples:

```
LCAH1MAT
XX ---------- Building:     Law Courts
  XXX ------- System:       Air Handler #1
     XXX ---- Point:        Mixed Air Temperature

LCVVSB216SAF
XX ---------- Building:     Law Courts
  XXX ------- System:       Variable Volume South
     XXXX --- Term unit:    Box for room 216
          XXX Point:        Supply Air Flow rate
```

In a single building system the complete logical point mnemonic would omit the first level. Examples:

```
AH1MAT
XXX --------- System:       Air Handler #1
   XXX ------ Point:        Mixed Air Temperature

VVSB216SAF
XXX --------- System:       Variable Volume South
   XXXX ----- Term unit:    Box for room 216
       XXX -- Point:        Supply Air Flow rate

BSP1
XX ---------- System:       Boiler System
  XX -------- Point:        Pump #1

BSP1-S
XX ---------- System:       Boiler System
  XX -------- Point:        Pump #1
    X ------- Delimiter
     X ------ Attribute:    Status

BSB3-E
XX ---------- System:       Boiler System
  XX -------- Point:        Boiler #3
    X ------- Delimiter
     X ------ Attribute:    Enable

VVSSAF-T
XXX --------- System:       Variable Volume South
   XXX ------ Point:        Supply Air Flow rate
      X ----- Delimiter
       X ---- Attribute:    Transducer
```

2.5 Except for the appending attribute characters, levels within the mnemonics should not be separated by spaces or other punctuation, unless absolutely required by the system. Their addition adds little to comprehension but significantly increases the number of keystrokes used in creating programming or editing database.

2.6 The building portion of the mnemonic is not necessarily for single building applications.

2.7 As a general rule, each character in the logical point mnemonic represents one word used to describe the point. Examples:

AH1CCV	Air Handler 1 (system), Cooling Coil Valve (point)
HWSWT	Heating Water (system), Supply Water Temperature (point)
VVNMAD	Variable Volume North (system), Mixed Air Dampers (point)

2.8 Where glycol is used in place of water, "G" replaces "W". Example:

BSSWT	Boiler System Supply Water Temperature
BSSGT	Boiler System Supply Glycol Temperature

2.9 There are always a few alarm points, such as an elevator sump level, that are difficult to place with any particular mechanical system. These miscellaneous points are best placed together under system name MIS.

3.0 VIRTUAL POINTS - SPECIFICS

3.1 Definition: Virtual point

A numeric variable (value stored in computer memory), that has associated with it, data similar to that of a real physical point. This variable can be commanded or used in control programs. It can be assigned units as well as any other normal database information but is not a real physical point.

3.2 The basic uses for these points are:

.1 Global virtual points are used to set building operating modes or calculate values that are used by many systems

.2 System virtual points associated with physical points or mechanical systems to provide information such as operating flags, setpoints, controller gains, user adjust values and max/min/average/effective space conditions.

.3 Local virtual points used to hold intermediate calculated information such as factors used in determining setpoints.

.4 Speciality virtual points that are used in the calculation of information that is further used to produce some global flags or the like. An example would be the point mnemonics used in an outside air temperature projection routine.

3.3 Global virtual points, by their nature, are used in the control sequences of many mechanical systems. They are used to summarize information for operator use and to totalize values, obtained from many smaller systems, for use by a building wide system such as the heating or cooling systems. These points are usually included on at least one graphic screen. Although the way many of these values are determined may be complex, their use is usually obvious. As such, many have been given simple word like mnemonics. The following are some recommended mnemonics that have evolved over time and are in common use:

GLOBAL BUILDING TEMPERATURE TARGETS & OPERATING MODES

STOBJ	Space temperature objective
STOBJ_UA	STOBJ user adjust
OCCUPIED	Occupied mode flag
PURGE	Purge mode flag
PREHEAT	Preheat mode flag
PRECOOL	Precool mode flag

GLOBAL INFORMATION

HTGDMND	Overall heating demand (sum of all air sys heating demands)
CLGDMND	Overall cooling demand (sum of all air sys cooling demands)
ST_MAX	Maximum building space temperature in the building
ST_AVG	Average building space temperature
ST_MIN	Minimum building space temperature
ST_EFF	Effective building space temperature
CRTIME	Calculated real time (decimal hours) if not provided by control system)

3.4 A larger building is often split into various areas with a dedicated air handling system serving each area. If each of these areas has differing occupancy schedules, it is possible to have a separate set of operating mode flags for each area as follows:

STOBJ#	Space temperature objective for area #
STOBJ#_UA	User adjust for STOBJ for area #
OCCUP#	Occupied mode flag for area #
PURGE#	Purge mode flag for area #
PREHEAT#	Preheat mode flag for area #
PRECOOL#	Precool mode flag for area #

3.5 System virtual points usually relate to some function associated with the control of a physical property. They should be named similarly but with an extension that describes the function being performed. The following appending attribute mnemonics are recommended:

_SP	setpoint	_GO	system go flag
_UA	user adjust	_RT	run time
_CO	controller	_HL	high limit
_PG	controller proportional gain	_LL	low level
_IG	controller integral gain	_ALM	alarm
_DG	controller derivative gain	_LEAD	lead/lag flag
_MAX	maximum	_AVG	average
_MIN	minimum	_EFF	effective

3.6 Setpoints and controllers are named after the controlled variable, not the device doing the controlling. (i.e. AH1CCV_SP is meaningless) An example of supply air temperature control follows:

AH1SAT	Supply Air Temperature (physical point) controlled variable
AH1SAT_UA	Supply Air Temp User Adjust (an offset applied to setpoint)
AH1SAT_SP	Supply Air Temperature SetPoint
AH1SAT_CO	Supply Air Temperature COntroller
AH1SAT_PG	Supply Air Temperature controller Proportional Gain

3.8 More examples of common system virtual point mnemonics:

AH1_GO	Air Handler 1 GO flag (“yes” to run AH1, “no” to stop AH1)
AH1MAD_MIN	Minimum desired position for AH1 mixed air dampers
AH1SF_RT	Run time for AH1 supply fan
BSRWT_LL	Boiler system return water temperature low limit
BSSWT_HL	Boiler system supply water temperature high limit
BSRWT_ALM	Boiler system low return water temperature alarm

3.9 As alluded to in global virtuals above, some system points are necessary to pass information that will be summed or manipulated in some fashion by a more global routine. Examples of some of these are:

AH#CDMND	Cooling demand value from air system AH#
AH#HDMND	Heating demand value from air system AH#
AH#ST_MAX	Maximum space temperature in zones served by AH#
AH#ST_AVG	Average space temperature in zones served by AH#
AH#ST_MIN	Minimum space temperature in zones served by AH#
AH#ST_EFF	Effective space temperature in zones served by AH#

3.10 The uses for local virtual points are so varied that no standard can be proposed. Sound judgement should be used in coming up with mnemonics that fit within the overall scheme yet succinctly describe their use. These points are rarely shown on a graphic screens. Since most uses are sufficiently complex, program comments are required to explain their function. As such, long descriptive mnemonics are not required because the program comments should already explain their purpose in detail. Examples:

AH1SAT_SPF1	Factor 1 in the calculation of AH1 Supply Air Temp Setpoint
AH1MAD_OALF	Outside air temp linearization multiplication factor.

3.11 Over the years some speciality calculations have become somewhat standard and the virtual points mnemonics used have been standardized as well. A good example is the outside temperature projection routine:

SPECIALITY VIRTUAL POINTS

OAT	Temperature selected or calculated for use in projector.
OATPHT	Projected high temperature
OATPLT	Projected low temperature
OATHDH	Hour of day's high temperature
OATHDL	Hour of day's low temperature
OATYTD	Yesterday's temperature difference
OATDH	Day's high
OATDL	Day's low
WARMDAY	Warm day flag
COLDDAY	Cold day flag

4.0 STANDARD FOR LOGICAL POINT MNEMONICS

The following articles and tables attempt to list the majority of possible point mnemonics for the most common building mechanical systems. It is unlikely that any one mechanical system will contain all the points listed. Some are mutually exclusive (e.g. supply fan vanes and supply fan speed), others are simply not common. It is also unlikely that all necessary point mnemonics will be found in this document. Some creativity will be required to create the new names in such a way as to conform to the basics of this standard. The mnemonics are provided to assist in naming the points used in a particular design, NOT as a guideline to create the design.

Allowed number of characters:

BUILDING	SYSTEM	SYS POINT	TERM POINT	ATTRIBUTE
1-2	1-3	2-4	1-3	1-4

NOTE: Physical/hardware point attributes such as amps, enable, fault, override, reset, status and transducer are always 1 character in length. Attributes used in virtual points such as setpoint, user adjusts and others are always 2 or more characters in length.

4.1 BUILDING LEVEL MNEMONICS

This level is used only if more than one building is under the control of a single EMCS. A one or two character abbreviation is used to designate each building within the system.

4.2 SYSTEM LEVEL MNEMONICS

This level uses a 2 to 3 character abbreviation to identify a particular mechanical system. A "* " in the following lists indicates that an additional character or number can be used to help identify a specific system when more than one of a particular type exists. E.g. AH1, AH2, AH3 etc.

4.2.1 Air Systems

AH* Air Handler – constant volume single zone or terminal reheat
DD* Dual Duct
IS* Induction System
MU* Makeup air Unit
MZ* MultiZone
VV* Variable air Volume

4.2.2 Cooling Systems

CT* Cooling Tower
CW* Chilled Water
DC* Dry Cooler – subset of points required for CT*

4.2.3 Electrical Systems

LS* Lighting System – used only if there are many lighting points
PD* Power Distribution – includes emergency generator
PL* Parking Lot

4.2.4 Heating Systems

BA* Boiler Air – combustion air for boiler room
BS* Boiler System – large systems, boilers and supporting equipment
HE* Heat Exchanger
HW* Heating Water – includes boilers in simpler systems
PR* Perimeter Radiation – if complex or on separate loop
RP* Radiant Panel – if complex or on separate loop
TR* Terminal Reheat – if complex or on separate loop

4.2.5 Other Systems

CA* Control Air
DCW Domestic Cold Water
DHW Domestic Hot Water
FA Fire Alarm – may include smoke exhaust points
FP Fire Protection – Sprinklers etc. – may be rolled into fire alarm system
HP Heat Pump
OA* Outside Air information – temp, hum, projected conditions etc.
PG* Parking Garage – combines CO sensors, exhaust fans and makeup units
SH* Space Humidity – if monitoring/controlling separate spaces (museums)
ST* Space Temperature – if not associated with any particular air system
MIS Miscellaneous – for odd points that don't fit in elsewhere
- e.g. elevator sump alarms,

4.3 POINT LEVEL MNEMONICS

The actual point mnemonic portion may consist of up to three levels depending on how the point relates to the mechanical system. A physical point directly associated with a system would consist of a single level representing the point with 2-4 characters. A terminal point will require a 2-4 character terminal box identifier followed by 1-3 characters representing the actual point. Finally, any of these can be followed by an appending attribute.

In any case, room has been left for an additional number or letter to distinguish multiple like points. For example, if an air system has two supply fans then one would likely be named SF1, the other SF2. In a similar fashion, if a wetted media humidifier were split into three sections with a solenoid for each portion, then the solenoids would be named SH1, SH2, SH3.

4.3.1 Physical Point Attributes

NOTE: The reference to a VAV system speed drive and supply air flow rate is included only to provide a context for the attribute examples.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
				VAV air system	*VV*
				Supply Fan (speed drive)	*VVSF*
SF		E	DO	Enable	VVSF-E
SF		S	DI	Status	VVSF-S
SF		F	DI	Fault	VVSF-F
SF		O	DI	Override (drive in local manual ctrl)	VVSF-O
SF		A	AI	Amps	VVSF-A
SFS			AO	Supply Fan Speed	VVSFS
SAF		T	AI	Transmitter (Raw Data) - used when input requires program manipulation to provide usable value	VVSAF-T

4.3.2 Air System: AH* (Air Handler – Self Contained Packaged Controls)

Some small air systems and most gas fired makeup air units contain their own packaged control system. These usually allow external start/stop or enable control and usually provide contacts for system status and possibly an alarm. Most can also be fitted so as to accept an external signal for resetting the system's supply air temperature setpoint. The following provides mnemonics for EMCS points interfacing to these packaged control systems:

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
				Air System	*AH1*
		E	DO	System Enable (packaged controls)	AH1-E
		S	DI	System Status (packaged controls)	AH1-S
		F	DI	System Fault (packaged controls)	AH1-F
MAD		O	DO	Mix Dampers - Economizer Override - wired into controls package	AH1MAD-O
SAT			AI	Supply Air Temperature	AH1SAT
		R	AO	SetPoint Reset (packaged controls)	AH1-R

4.3.3 Air System: AH* (Air Handler – Single Zone or Terminal Reheat)

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
SF			DO	Supply Fan	AH1SF
SFH			DO	Supply Fan High Speed	AH1SFH, AH1SFH2
SFL			DO	Supply Fan Low Speed	AH1SFL, AH1SFL2
RF			DO	Return Fan	AH1RF2
RFH			DO	Return Fan High Speed	AH1RFH, AH1RFH2
RFL			DO	Return Fan Low Speed	AH1RFL, AH1RFL2
EF			DO	Exhaust Fan	AH1EF, AH1EF4
CCP			DO	Cooling Coil Pump	AH1CCP
HCP			DO	Heating Coil Pump	AH1HCP
PCP			DO	Preheat Coil Pump	AH1PCP
DX			DO	Direct Expansion Cooling Solenoid	AH1DX, AH1DX2
DXC		E	DO	DX Compressor – Enable (pkg ctrls)	AH1DXC-E
SH			DO	Spray Humidifier Solenoid	AH1SH, AH1SH3
SF		S	DI	Supply Fan – Status	AH1SF-S
SFH		S	DI	Supply Fan High Speed – Status	AH1SFH-S
SFL		S	DI	Supply Fan Low Speed – Status	AH1SFL-S
RF		S	DI	Return Fan – Status	AH1RF2-S
RFH		S	DI	Return Fan High Speed – Status	AH1RFH2-S
RFL		S	DI	Return Fan Low Speed – Status	AH1RFL2-S
EF		S	DI	Exhaust Fan – Status	AH1EF-S
FP			DI	Freeze Protect (stat)	AH1FP
SAT			AI	Supply Air Temperature	AH1SAT
MAT			AI	Mixed Air Temperature	AH1MAT
RAT			AI	Return Air Temperature	AH1RAT
PHT			AI	Preheat Air Temperature	AH1PHT
SAH			AI	Supply Air Humidity	AH1SAH
RAH			AI	Return Air Humidity	AH1RAH
ST			AI	Space Temp (if not terminal equip.)	AH1ST1, AH1ST3
CCV			AO	Cooling Coil Valve	AH1CCV
HCV			AO	Heating Coil Valve	AH1HCV
PCV			AO	Preheat Coil Valve	AH1PCV
HV			AO	Humidifier Valve (steam)	AH1HV
MAD			AO	Mixed Air Dampers	AH1MAD
FAD			AO/DO	Fresh Air Damper	AH1FAD
RD			AO/DO	Relief Damper	AH1RD
FBD			AO	Face and Bypass Dampers	AH1FBD
Z***				Zone *** Terminal Equipment	AH1Z305
|				- designate by room # or location	
|→	ST		AI	Space Temperature	AH1Z305ST
|→	SAT		AI	Supply Air Temperature	AH1Z305SAT
|→	RCV		AO	Reheat Coil Valve	AH1Z305RCV
|→	PRV		AO	Perimeter Radiation Valve and/or	AH1Z305PRV
|→	RPV		AO	Radiant Panel Valve as applicable	AH1Z305RPV

Note: Single zone air systems do not require items in "Terminal Point" column.

4.3.4 Air System: DD* (Dual Duct)

Includes most of the system point mnemonics under AH plus the following:

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
CDT			AI	Cold Deck Temperature	DDNCDT
HDT			AI	Hot Deck Temperature	DDNHDT
DDP			AI	Duct Differential Pressure	DDNDDP
CDV			AO	Cold Deck Valve	DDNCDV
HDV			AO	Hot Deck Valve	DDNHDV
B***				Box *** Terminal Equipment	DDNZ508
|				- designate by room # or location	
|→	ST		AI	Space Temperature	DDNZ508ST
|→	SAT		AI	Supply Air Temperature	DDNZ508SAT
|→	SAF		AI	Supply Air Flow Rate (for DD VAV)	DDNZ508SAF
|→	D		AO	Box Mixing Damper	DDNZ508D
|→	CDD		AO	Cold Duct Damper (for DD VAV)	DDNZ508CDD
|→	HDD		AO	Hot Duct Damper (for DD VAV)	DDNZ508HDD

4.3.5 Air System: IS* (Induction System)

Includes most of the system point mnemonics under AH plus the following:

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
U***				Unit *** Terminal Equipment	IS2Z508
|				- designate by room # or location	
|→	ST		AI	Space Temperature	IS2Z508ST
|→	SAT		AI	Supply Air Temperature	IS2Z508SAT
|→	V		AO	Coil Valve	IS2Z508SAF

4.3.6 Air System: MU* (Make-up air Unit)

Includes most of the system point mnemonics under AH.

4.3.7 Air System: MZ* (Multizone)

Includes most of the system point mnemonics under DD plus the following:

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
DHS			AI	Damper High Select	MZ1DHS
DLS			AI	Damper Low Select	MZ1DLS
				(these are rarely used anymore)	
Z***					
|				Zone ***	MZ2Z1, MZ2Z2, MZ2Z3
|→	ST		AI	- designate sequentially by zone #	
|→	SAT		AI	Space Temperature	MZ1Z3ST
|→	D		AO	Supply Air Temperature (not common)	MZ1Z3SAT
				Zone Mixing Damper	MZ1Z3D

4.3.8 Air System: VV* (Variable air Volume)

Includes most of the system point mnemonics under AH plus the following:

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
SF			DO	Supply Fan	VV2SF
RF			DO	Return Fan	VV2RF
SF		E	DO	Supply Fan – Enable (speed drive)	VV1SF-E
RF		E	DO	Return Fan – Enable (speed drive)	VV1RF-E
SF		S	DI	Supply Fan – Status	VV2SF-S
RF		S	DI	Return Fan – Status	VV2RF-S
SF		F	DI	Supply Fan – Fault (speed drive)	VV1SF-F
RF		F	DI	Return Fan – Fault (speed drive)	VV1RF-F
SF		A	AI	Supply Fan – Amps	VV1SF-A
RF		A	AI	Return Fan – Amps	VV1RF-A
SVP			AI	Supply Velocity Pressure	VV1SVP, VV3SVP2
RVP			AI	Return Velocity Pressure	VV1RVP, VV2RVP2
SAF			AI	Supply Air Flow Rate	VV1SAF
RAF			AI	Return Air Flow Rate	VV1RAF
BSP			AI	Branch Static Pressure	VV1BSP
BDP			AI	Building Differential Pressure	VV1BDP
SFV			AO	Supply Fan Vanes	VV3SFV
RFV			AO	Return Fan Vanes	VV3RFV
SFP			AO	Supply Fan Pitch	VV2SFP
RFP			AO	Return Fan Pitch	VV2RFP
SFS			AO	Supply Fan Speed	VV1SFS
RFS			AO	Return Fan Speed	VV1RFS
B***				Box *** Terminal Equipment	VV1Z229
|				- designate by room # or location	
|→	F		DO	Fan	VV1Z229F
|→	ST		AI	Space Temperature	VV1Z229ST
|→	SAT		AI	Supply Air Temperature	VV1Z229SAT
|→	SVP		AI	Supply Velocity Pressure	VV1Z229SVP
|→	SAF		AI	Supply Air Flow Rate	VV1Z229SAF
|→	D		AO	Flow Control Damper	VV1Z229D
|→	PRV		AO	Perimeter Radiation Valve	VV1Z229PRV
|→	RPV		AO	Radiant Panel valve	VV1Z229RPV
|→	RCV		AO	Reheat Coil Valve	VV1Z229RCV

4.3.9 Cooling System: CT* / DC* (Cooling Tower / Dry Cooler)

The dry cooler mnemonics are a subset of those required for a cooling tower.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
F			DO	Fan (single speed)	CTF, CT2F, CT2F1
FH			DO	Fan High Speed	CTFH, CT2FH1
FL			DO	Fan Low Speed	CTFL, CT2FL1
F		E	DO	Fan – Enable (speed drive)	CT1F-E, CT2F1-E
P			DO	Pump	CTP1, CTP2
D			DO	Dump (valves/solenoids)	CTD, CT2D
BH			DO	Basin Heater	CTBH, CT2BH
HT			DO	Heat Trace	CTHT, CT2HT
F		S	DI	Fan – Status	CT2F-S
FH		S	DI	Fan High Speed – Status	CTFH-S, CT2FH1-S
FL		S	DI	Fan Low Speed – Status	CTFL-S, CT2FL-S
F		F	DI	Fan – Fault (speed drive)	CT1F-F
P		S	DI	Pump Status	CTP1-S, CTP2-S
BL			DI	Basin Level (level alarm)	CTBL
F		A	AI	Fan – Amps	CT1F-A
SWT			AI	Supply (tower leaving) Temperature	CT1SWT
RWT			AI	Return (tower entering) Temperature	CT1RWT
BT			AI	Basin Temperature	CT1BT
FS			AO	Fan Speed	CT1FS
FOD			AO	Fan Outlet Damper	CTFOD, CTFOD2
BPV			AO	Bypass Valve	CTBPV
CV			AO	Control Valve	CTCV

4.3.10 **Cooling System: CW* (Chilled Water)**

Since many points are associated with each chiller, it is possible to treat an individual chiller in the same manner as terminal equipment.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DO	Pump (general)	CWP1, CWP2
P		E	DO	Pump – Enable (speed drive)	CWP-E
PP			DO	Primary Pump	CWPP, CWPP1
PP		E	DO	Primary Pump – Enable (speed drive)	CWPP-E, CWPP1-E
SP			DO	Secondary Pump	CWSP, CWSP1
SBP			DO	Stand-by Pump	CWSBP
ISP			DO	Ice Storage Pump	CWISP
P		S	DI	Pump (general) – Status	CWP1-S, CWP2-S
P		F	DI	Pump – Fault (speed drive)	CWP1-F
PP		S	DI	Primary Pump – Status	CWPP-S, CWPP1-S
PP		F	DI	Primary Pump – Fault (speed drive)	CWPP-F, CWPP1-F
SP		S	DI	Secondary Pump – Status	CWSP-S, CWSP1-S
SBP		S	DI	Stand-by Pump – Status	CWSBP-S
ISP		S	DI	Ice Storage Pump – Status	CWISP-S
ISL			DI	Ice Storage Level (level alarm)	CWISL
ET			DI	Expansion Tank (level alarm)	CWET
FS			DI	Flow Switch (general)	CWFS
P			AI	Pump (general) – Amps	CWP1-A
SWT			AI	Supply Water Temperature	CWSWT
RWT			AI	Return Water Temperature	CWRWT
SSP			AI	Supply Static Pressure	CWSSP
SWF			AI	Supply Water Flow Rate	CWSWF
IST			AI	Ice Storage Supply Temperature	CWIST
IRT			AI	Ice Storage Return Temperature	CWIRT
ISS			AI	Ice Storage Sensor	CWISS
PS			AO	Pump Speed	CWPS
PPS			AO	Primary Pump Speed	CWPPS
C#				Chiller #	CWC, CWC1, CWC2
|				- designate by chiller #	
|→	S		DO	Compressor Stage	CWCS2, CWC1S1
|→		E	DO	Chiller – Enable (packaged controls)	CWC-E, CWC1-E
|→	S	S	DI	Compressor Stage – Status	CWCS1-S, CWC1S1-S
|→		S	DI	Chiller – Status (packaged controls)	CWC1-S
|→		F	DI	Chiller – Fault (packaged controls)	CWC1-F
|→		A	AI	Chiller – Current Draw (amps)	CWC1-A
|→		R	AO	Chiller – SetPoint Reset (pkg controls)	CWC1-R
|→	LL		AO	Chiller – Load Limit	CWC1LL

4.3.11 Electrical System: LS* (Lighting System)

Use this system only if there are a large number of lighting points, otherwise include the few lighting zones under PD (Power distribution).

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
E			DO	Exterior Lighting - provide face or area information	LSE, LSE1, LSESW
PL			DO	Parking Lot	LSPL, LSPL2, LSPLS
Z			DO	Zone – lighting control - provide floor and room or area	LSZ305, LSZ3NE
S			DI	Zone – switch input - provide floor and room or area	LSS305, LSS3NE
PC			DI	Photocell (day/night status)	LSPC

4.3.12 Electrical System: PL* (Parking Lot)

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
L			DO	Lot Lighting	PLL, PL1L, PLNL, PLSL
O			DO	Lot Outlets	PLO, PLO1, PLO2

4.3.13 Electrical System: PD* (Power Distribution)

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
LZ			DO	Lighting Zone (for a few zones only) - indicate interior/exterior/room or area	PDLZ1, PDLZE, PDLZ3W, PDLZ402
GDT			DI	E Generator Day Tank (level alarm)	PDGDT, PDGDT2
GMT			DI	E Generator Main Tank (level alarm)	PDGMT
GTS			DI	E Generator Transfer Switch	PDGTS, PDGTS1
G		S	DI	E Generator Status	PDG-S, PDG1-S
G		F	DI	E Generator Fault (alarm)	PDG-F, PDG1-F
CT			AI	Current Transformer (one / phase)	PDCT1,PDCT2,PDCT3
PT			AI	Potential Transformer (one / phase) - for feeder “n” phase “#”	PDPT1,PDPT2,PDPT3 PDCTn#, PDPTn#
WM			AI	Watt Meter	PDWM, PDWM2
ERT			AI	Electrical Room Temperature	PDERT, PDERT019
TT			AI	Transformer Temperature	PDTT, PDTT019

4.3.14 **Heating System: BA* (Boiler** *combustion* **Air)**

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
F			DO	Fan	BAF, BAF2, BAF3
F		E	DO	Fan – Enable (speed drive)	BAF-E
F		S	DI	Fan – Status	BAF-S, BAF2-S
F		F	DI	Fan – Fault (speed drive)	BAF-F
SAT			AI	Supply Air Temperature	BASAT
BRT			AI	Boiler Room Temperature	BABRT
BRP			AI	Boiler Room Pressure	BABRP
HCV			AO	Heating Coil Valve	BAHCV
FS			AO	Fan Speed	BAFS

4.3.15 Heating System: BS* (Boiler System)

This system mnemonic is intended for large or complicated systems with many boilers. Since many points are associated with each boiler, it is possible to treat an individual boiler in the same manner as terminal equipment. This also makes it possible to use the same naming scheme in smaller systems where the boiler points are included in the Heating Water system.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DO	Pump (general)	BSP, BSP2, BSP7
CP			DO	Condensate Pump	BSCP
FWP			DO	Feedwater Pump	BSFWP
PP			DO	Primary Pump	BSPP1, BSPP2
P		S	DI	Pump – Status (general)	BSP-S, BSP2-S
CP		S	DI	Condensate Pump – Status	BSCP-S
FWP		S	DI	Feedwater Pump – Status	BSFWP –S
PP		S	DI	Primary Pump – Status	BSPP1-S, BSPP2-S
CT			DI	Condensate Tank (level alarm)	BSCT
ET			DI	Expansion Tank (level alarm)	BSET
FS			DI	Flow Switch (general)	BSFS
SWT			AI	Supply Water Temperature	BSSWT
RWT			AI	Return Water Temperature	BSRWT
MSP			AI	Mains Steam Pressure	BSMSP
MSF			AI	Mains Steam Flow Rate	BSMSF
DP			AI	Differential Pressure	BSDP
GM			AI/DI	Gas Meter (pulse or other input)	BSGM
PBV			AO	Pressure Bypass valve	BSPBV
B#				Boiler #	BSB, BSB1, BSB5
|				- designate by boiler #	
|→			DO	single stage boiler direct control	BSB, BSB1, BSB5
|→	HF		DO	Boiler High Fire	BSB1HF, BSB2HF
|→	LF		DO	Boiler Low Fire	BSB1LF, BSB2LF
|→	P		DO	Boiler circ Pump	BSBP, BSB1P, BSB5P
|→		E	DO	Boiler – Enable (packaged controls)	BSB-E, BSB3-E
|→	FS		DI	Boiler Flow Switch	BSBFS, BSB3FS
|→	FF		DI	Boiler Flame Failure	BSBFF, BSB3FF
|→		S	DI	Boiler – Status (packaged controls)	BSB1-S
|→		F	DI	Boiler – Fault (packaged controls)	BSB1-F
|→	ST		AI	Boiler Supply Temperature	BSB1ST, BSB2ST
|→	GV		AO	Gas Valve (direct control)	BSB1GV, BSB2GV
|→	FR		AO	Firing Rate (indirect control)	BSB1FR
		R	AO	Boiler – SetPoint Reset (pkg controls)	BSB1-R

NOTE: For glycol systems use "G" (glycol) in place of "W" (water).

4.3.16 **Heating System: HE* (Heat Exchanger)**

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DO	Pump (general)	HE1P, HENP2
HCP			DO	Heating Coils Pump	HEHCP, HEHCP2
PCP			DO	Preheat Coils Pump	HEPCP1, HEPCP2
SBP			DO	Stand-by Pump	HESBP
as ↑		E	DO	Pump (speed drive) – Enable	HEP-E, HEHCP-E
P		S	DI	Pump (general) – Status	HEP-S, HEP2-S
HCP		S	DI	Heating Coils Pump – Status	HEHCP-S, HEHCP2-S
PCP		S	DI	Preheat Coils Pump – Status	HEPCP-S, HEPCP2-S
SBP		S	DI	Stand-by Pump – Status	HESBP-S
as ↑		S	DI	Pump (speed drive) – Status	HEP-S, HEPRP-S
as ↑		F	DI	Pump (speed drive) – Fault	HEP-F, HEPRP-F
ET			DI	Expansion Tank (level alarm)	HEET, HEET2
SWT			AI	Supply Water Temperature	HESWT
RWT			AI	Return Water Temperature	HERWT
HCST			AI	Heating Coils Supply Temperature	HEHCST
PCST			AI	Preheat Coils Supply Temperature	HEPCST
V			AO	Control Valve	HEV
SV			AO	Steam Valve	HESV
HCV			AO	Heating Coils Valve	HEHCV
PCV			AO	Preheat Coils Valve	HEPCV
as ↑			AO	Pump (speed drive) – Speed	HEPS, HERPPS

NOTE: For glycol systems use "G" (glycol) in place of "W" (water).

4.3.17 Heating System: HW* (Heating Water)

It is intended that this system mnemonic contain the distribution heating systems for typical applications. For simple buildings it can also include many of the boiler points under BS and possibly some points under HE etc.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DO	Pump (general)	HWP, HWP2
P			DO	Secondary Pump	HWSP, HWSP2
HCP			DO	Heating Coils Pump	HWHCP, HWHCP2
PCP			DO	Preheat Coils Pump	HWPCP, HWPCP2
RCP			DO	Reheat Coils Pump	HWRCP, HWRCP2
PRP			DO	Perimeter Radiation Pump	HWPRP, HWPRP2
RPP			DO	Radiant Panels Pump	HWRPP, HWRPP2
SBP			DO	Stand-by Pump	HWSBP
as ↑		E	DO	Pump (speed drive) – Enable	HWP-E, HWPRP-E
P		S	DI	Pump (general) – Status	HWP-S, HWP2-S
P		S	DI	Secondary Pump – Status	HWSP-S, HWSP2-S
HCP		S	DI	Heating Coils Pump – Status	HWHCP-S, HWHCP2-S
PCP		S	DI	Preheat Coils Pump – Status	HWPCP-S, HWPCP2-S
RCP		S	DI	Reheat Coils Pump – Status	HWRCP-S, HWRCP2-S
PRP		S	DI	Perimeter Radiation Pump – Status	HWPRP-S, HWPRP2-S
RPP		S	DI	Radiant Panels Pump – Status	HWRPP-S, HWRPP2-S
SBP		S	DI	Stand-by Pump – Status	HWSBP-S
as ↑		S	DI	Pump (speed drive) – Status	HWP-S, HWPRP-S
as ↑		F	DI	Pump (speed drive) – Fault	HWP-F, HWPRP-F
ET			DI	Expansion Tank (level alarm)	HWET, HWET2
SWT			AI	Supply Water Temperature	HWSWT
RWT			AI	Return Water Temperature	HWRWT
HCST			AI	Heating Coils Supply Temperature	HWHCST
PCST			AI	Preheat Coils Supply Temperature	HWPCST
RCST			AI	Reheat Coils Supply Temperature	HWRCST
PRST			AI	Perimeter Radiation Supply Temp.	HWPRST
RPST			AI	Radiant Panels Supply Temperature	HWRPST
DP			AI	Differential Pressure	HWDP
V			AO	Control Valve	HWV
HCV			AO	Heating Coils Valve	HWHCV
PCV			AO	Preheat Coils Valve	HWPCV
RCV			AO	Reheat Coils Valve	HWRCV
PRV			AO	Perimeter Valve	HWPRV
RPV			AO	Radiant Panels Valve	HWRPV
PBV			AO	Pressure Bypass Valve	HWPBV
as ↑			AO	Pump (speed drive) – Speed	HWPS, HWRPPS

NOTE: For glycol systems use "G" (glycol) in place of "W" (water).

4.3.18 Heating System: PR* (Perimeter Radiation)

Use this system mnemonic for complex/multiple perimeter radiation systems or where the addition of these points to HW* would make it unwieldy. For simple buildings these points are usually included under HW as described previously.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DO	Pump	PRP, PR2P1, PRNP2
as ↑		E	DO	Pump (speed drive) – Enable	PRP-E, PR2P1-E
P		S	DI	Pump – Status	PRP-S, PR2P1-S
as ↑		S	DI	Pump (speed drive) – Status	PRP-S, PR2RP1-S
as ↑		F	DI	Pump (speed drive) – Fault	PRP-F, PR2P1-F
ET			DI	Expansion Tank (level alarm)	PRET, PRNET
SWT			AI	Supply Water Temperature	PRSWT, PR2SWT
RWT			AI	Return Water Temperature	PRRWT, PR2RWT
DP			AI	Differential Pressure	RPDP
V			AO	Control Valve	PRV
PBV			AO	Pressure Bypass Valve	RPPBV
as ↑			AO	Pump (speed drive) – Speed	PRPS, PR2P1S

NOTE: For glycol systems use "G" (glycol) in place of "W" (water).

4.3.19 Heating System: RP* (Radiant Panel)

Use this system mnemonic for complex/multiple radiant panel systems or where the addition of these points to HW* would make it unwieldy. For simple buildings these points are usually included under HW as described previously.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DO	Pump	RPP, RP2P1, RPNP2
as ↑		E	DO	Pump (speed drive) – Enable	RPP-E, RP2P1-E
P		S	DI	Pump – Status	RPP-S, RP2P1-S
as ↑		S	DI	Pump (speed drive) – Status	RPP-S, RP2RP1-S
as ↑		F	DI	Pump (speed drive) – Fault	RPP-F, RP2P1-F
ET			DI	Expansion Tank (level alarm)	RPET, RPNET
SWT			AI	Supply Water Temperature	RPSWT, RP2SWT
RWT			AI	Return Water Temperature	RPRWT, RP2RWT
DP			AI	Differential Pressure	RPDP
V			AO	Control Valve	RPV
PBV			AO	Pressure Bypass Valve	RPPBV
as ↑			AO	Pump (speed drive) – Speed	RPPS, RP2P1S

NOTE: For glycol systems use "G" (glycol) in place of "W" (water).

4.3.20 Heating System: TR* (Terminal Reheat)

Use this system mnemonic for complex/multiple terminal reheat systems or where the addition of these points to HW* would make it unwieldy. For simple buildings these points are usually included under HW as described previously.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DO	Pump	TRP, TR2P1, TRNP2
as ↑		E	DO	Pump (speed drive) – Enable	TRP-E, TR2P1-E
P		S	DI	Pump – Status	TRP-S, TR2P1-S
as ↑		S	DI	Pump (speed drive) – Status	TRP-S, TR2RP1-S
as ↑		F	DI	Pump (speed drive) – Fault	TRP-F, TR2P1-F
ET			DI	Expansion Tank (level alarm)	TRET, TRNET
SWT			AI	Supply Water Temperature	TRSWT, TR2SWT
RWT			AI	Return Water Temperature	TRRWT, TR2RWT
DP			AI	Differential Pressure	TRDP
V			AO	Control Valve	TRV
PBV			AO	Pressure Bypass Valve	TRPBV
as ↑			AO	Pump (speed drive) – Speed	TRPS, TR2P1S

NOTE: For glycol systems use "G" (glycol) in place of "W" (water).

4.3.21 Other Systems: CA* (Control Air)

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
C			DO	Compressor (control or lead select)	CAC1, CAC2
NS			DO	Night Setback	CANS
C		S	DI	Compressor – Status	CAC1-S, CSC2-S
D		F	DI	Dryer – Fault	CAD-F
P			DI/AI	Pressure	CAP
TP			DI/AII	Tank Pressure	CATP

4.3.22 Other Systems: DCW (Domestic Cold Water)

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DO	Pump	DCWP, DCWP2
P		S	DI	Pump – Status	DCWP-S, DCWP2-S
CWP			AI	City Water Pressure	DCWCWP
TP			AI	Tank Pressure	DCWTP

4.3.23 Other Systems: DHW (Domestic Hot Water)

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DO	Pump	DHWP, DHWP2
P		S	DI	Pump – Status	DHWP-S, DHWP2-S
SWT			AI	Supply Water Temperature	DHWSWT
RWT			AI	Return Water temperature	DHWRWT
TT			AI	Tank Temperature	DHWTT
HST			AI	High Supply Temp (dish washer etc.)	DHWHST
HTT			AI	High Tank Temp	DHWHTT
V			AO	Valve (general)	DHWV
HEV			AO	Heat Exchanger Valve	DHWHEV
MV			AO	Mixing Valve	DHWMV
SV			AO	Steam Valve	DHVSV

4.3.24 Other Systems: FA* (Fire Alarms)

The mnemonic should provide information as to the area served by the fire alarm point. Examples:

```
FA2NW
XX ---------- System:     Fire Alarms
  XXX ------- Area:       2nd Floor Northwest

FA302
XX ---------- System:     Fire Alarms
  XXX ------- Area:       Room 302
```

A multi-building site mnemonic must include the building designation. Example:

```
FABB2NW
XX ---------- System:     Fire Alarms
  XX -------- Building:   Bowker Building
     XXX ---- Area:       2nd Floor Northwest
```

NOTE: Fire alarm points are usually added for monitoring purposes or for smoke control. Only fire rated control systems are allowed to use these for other functions such as fan shut down etc.

4.3.25 Other Systems: FP* (Fire Protection)

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
P			DI	Fire Pump	FPP, FPP1, FPP2
SV			DI	Sprinkler Valve	FPSV
SP			DI/AI	Sprinkler Pressure	FPSP
TL			DI/AI	Tank Level (fire storage tank)	FPTL
TP			DI/AI	Tank Pressure (fire storage tank)	FPTP

NOTE: These points are usually added for monitoring and callout purposes only.

4.3.26 Other Systems: HP (Heat Pump)

This mnemonic encompasses only the actual heat pump loop, heat injection and heat rejection control valves as well as the actual heat pump units. The boilers and dry cooler or cooling tower systems should be treated separately under BS, HW, DC or CT.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
LP			DO	Loop Pump	HPLP1, HPLP2
LP		S	DI	Loop Pump – Status	HPLP1-S, HPLP2-S
ET			DI	Expansion Tank (level alarm)	HPET
LST			AI	Loop Supply Water Temperature	HPLST
LRT			AI	Loop Return Water temperature	HPLRT
LHIV			AO	Loop Heat Injection Valve	HPLHIV
LHRV			AO	Loop Heat Rejection Valve	HPLHRV
U***				Unit *** Heat Pump Unit	HPU229
|				- designate by room # or location	
|→	C		DO	Compressor	HPU229C
|→	F		DO	Fan	HPU229F
|→	FH		DO	Fan High Speed	HPU229FH
|→	FL		DO	Fan Low Speed	HPU229FL
|→	RV		DO	Reversing Valve	HPU229RV
|→	ST		AI	Space Temperature	HPU229ST
|→	SAT		AI	Supply Air Temperature	HPU229SAT

4.3.27 Other Systems: OA* (Outside Air)

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
T			AI	Temperature	OAT, OAT1, OAT2
H			AI	Relative Humidity	OAH, OAH1, OAH2
WD			AI	Wind Direction	OAWD
WS			AI	Wind Speed	OAWS

4.3.28 Other Systems: PG* (Parking Garage)

This mnemonic can be used to combine the various systems used in parkade CO sensing and ventilation. Since many points may be associated with each make-up air unit, it is possible to treat each such unit in the same manner as terminal equipment.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
EF			DO	Exhaust Fan	PGEF1, PGWEF2
EFH			DO	Exhaust Fan High Speed	PGEFH, PGEFH3
EFL			DO	Exhaust Fan Low Speed	PGEFL, PGEFL3
EF			DO	Exhaust Fan (speed drive) – Enable	PGEF-E, PGWEF-E
EF		S	DI	Exhaust Fan – Status	PGEF1-S, PGWEF2-S
EFH		S	DI	Exhaust Fan High Speed – Status	PGEFH-S, PGEFH3-S
EFL		S	DI	Exhaust Fan Low Speed – Status	PGEFL-S, PGEFL3-S
EF		S	DI	Exhaust Fan (speed drive) – Status	PGSF-S, PGEF1-S
EF		F	DI	Exhaust Fan (speed drive) – Fault	PGSF-F, PGEF1-F
DP			AI	Differential Pressure	PGDP, PGWDP3
EFS			AO	Exhaust Fan Speed (speed drive)	PGEFS, PGWEF2S
MU#				Make-up Unit #	PGMU, PGWMU1
|				- designate by unit #	
|→					
|→	FH		DO	MU Unit Fan High Speed	PGMU1FH
|→	FL		DO	MU Unit Fan Low Speed	PGMU2FL
|→		E	DO	MU Unit – Enable (packaged ctrls)	PGMU1-E
|→					
|→	FH	S	DI	MU Unit Fan High Speed – Status	PGMU1FH-S
|→	FL	S	DI	MU Unit Fan Low Speed – Status	PGMU2FL-S
|→		S	DI	MU Unit – Status (packaged ctrls)	PGMU1-S
|→		F	DI	MU Unit – Fault (packaged ctrls)	PGMU1-F
|→	SAT		AI	MU Unit Supply Air Temperature	PGMUSAT
|→		R	AO	MU Unit SetPoint Reset (pkg controls)	PGMU1-R

4.3.29 Other Systems: S* (Space Humidity and Temperature)

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
H			AI	Space Relative Humidity - designate by room # or location	SH903, SH8NW SH2E, SH3I
T			AI	Space Temperature - designate by room # or location	ST902, ST8NW ST2W, ST5I

4.3.30 Other Systems: MIS (Miscellaneous)

This system mnemonic is used for points that do not fit under any particular mechanical system for example:

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
ES			DI	Elevator Sump (level alarm)	MISES, MISES2
WTS			DI	Weeping Tile Sump (level alarm)	MISWTS, MISWTS2

4.3.31 Virtual Point Attributes

NOTE: Physical points and their mnemonics are included only to provide a context for the virtual point examples.

MNEMONIC			POINT TYPE	Description	Examples
SYS POINT	TERM. POINT	ATTRIB.			
			N/A	*Air Handling System 1*	*AH1*
		GO	V	System GO flag	AH1-GO
SAT			*AI*	*Supply Air Temperature*	*AH1SAT*
		UA	V	User Adjust	AH1SAT-UA
		SP	V	Set Point	AH1SAT-SP
		CO	V	Controller	AH1SAT-CO
		PG	V	Proportional Gain	AH1SAT-PG
		IG	V	Integral Gain	AH1SAT-IG
		DG	V	Derivative Gain	AH1SAT-DG
*ST**			*AI*	*Space Temperatures*	*AH1ST1, 2,3, etc*
		MAX	V	Maximum (Space Temperature)	AH1ST-MAX
		MIN	V	Minimum (Space Temperature)	AH1ST-MIN
		AVG	V	Average (Space Temperature)	AH1ST-AVG
		EFF	V	Effective (Space Temperature)	AH1ST-EFF
RWT			*AI*	*Boiler System, Return Water Temp*	*BSRWT*
		HL	V	High Limit	BSRWT-HL
		LL	V	Low limit	BSRWT-LL
		ALM	V	Alarm	BSRWT-ALM
P1			*DO*	*Pump 1*	*BSP1*
		RT	V	Run Time	BSP1-RT
		LEAD	V	Lead/Lag Flag	BSP1-LEAD

4.3.32 Common Virtual Points

Common mnemonics for virtual points have been described in sufficient detail previously. See article 3.0 “Virtual Points – Specifics”.

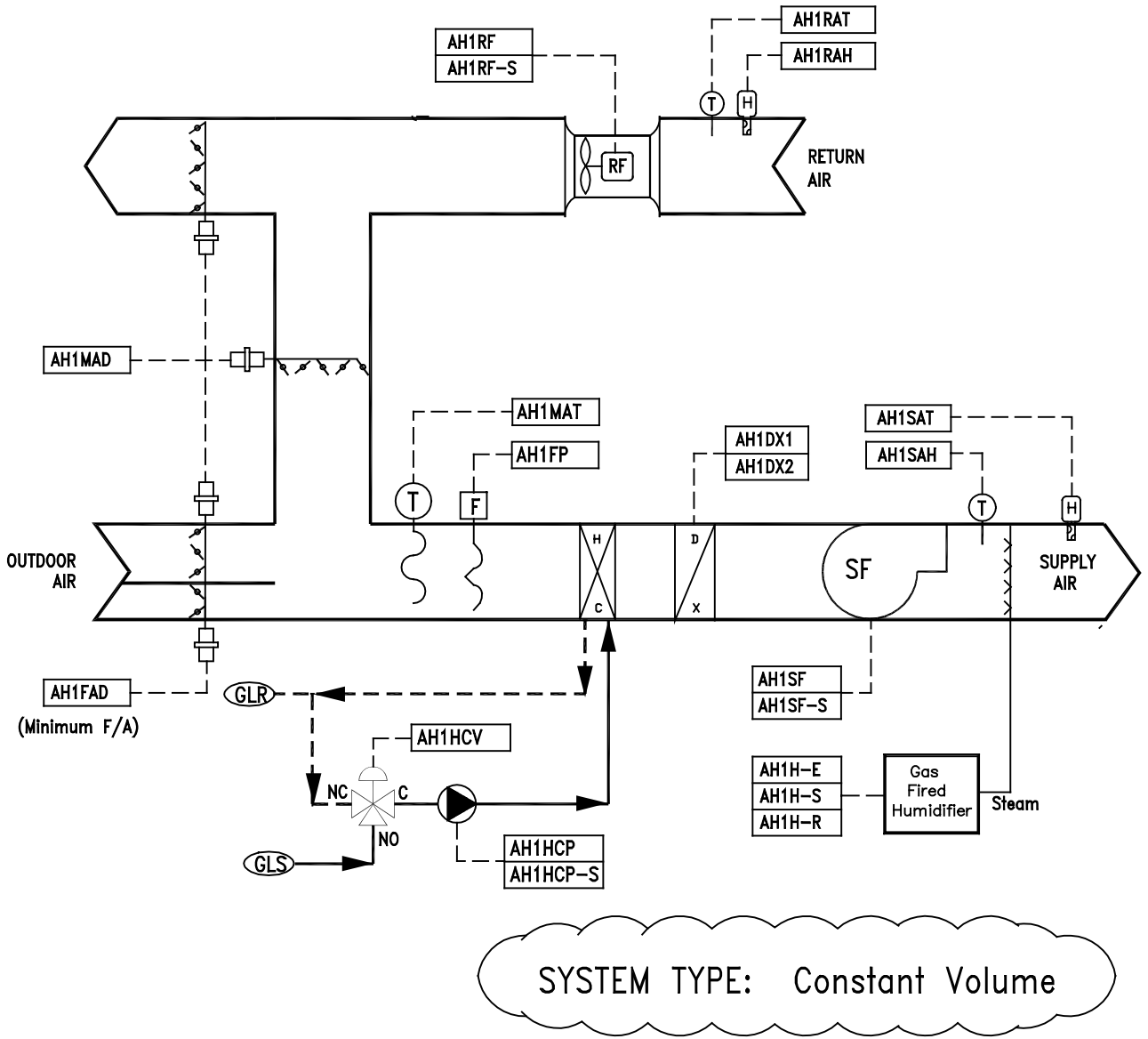
SAMPLE POINT SHEETS

AND

SCHEMATICS

The following point sheets and schematic diagrams are not intended to be a comprehensive compilation of all possible systems and their control points. They are only intended to be a representative sample of typical mechanical systems and the proper use of logical point mnemonics.

Example	Mnemonic	System	Type
1	AH1	Air System	Air Handler - Constant Volume
2	MZ1	Air System	Air Handler - Multi-Zone
3	VV1	Air System	Air Handler - Variable Volume
4	DD1	Air System	Air Handler - Dual Duct
5	PG	Air System	Air Handler - Parking Garage
6	AH1	Air System	Air Handler - Roof Top Unit
7	HP	Air System	Heat Pump
8	HW	Heating System	Heating Water - Atmoshperic Boilers
9	PR, TR	Heating System	Perimeter Radiation, Terminal ReHeat
10	BS	Heating System	Heating Water - Forced Draft Boilers
11	CH	Cooling System	Chilled Water, Cooling Tower



ROOM TEMPERATURE SENSORS

T	AH1ST1	Courtroom, Main Floor
T	AH1ST2	South Offices, Main Floor
T	AH1ST3	East Offices, Main Floor
T	AH1ST4	Basement office

SYSTEM TYPE: Constant Volume

USE FOR: Constant Volume, Terminal Re-Heat, Induction

LOCATION: Penthouse Fan Room

BID NO.:	B00XXX	SECTION:	15941	Alberta INFRASTRUCTURE	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ
SITE NO.:	S00XXX	DRAWN BY:	DC		
CENTRE CODE:	XXXXX	CHK'D BY:	RU		
PROJ FILE NO:	XXXXX	DATE:	08 JAN 02		
PLAN NO.:	00XXXX	SCALE:	NTS		

DESCRIPTION:	DRAWING
Building Name EMCS – Air System AH1	CSK-1 01-ah1.dwg PAGE 1 of 11

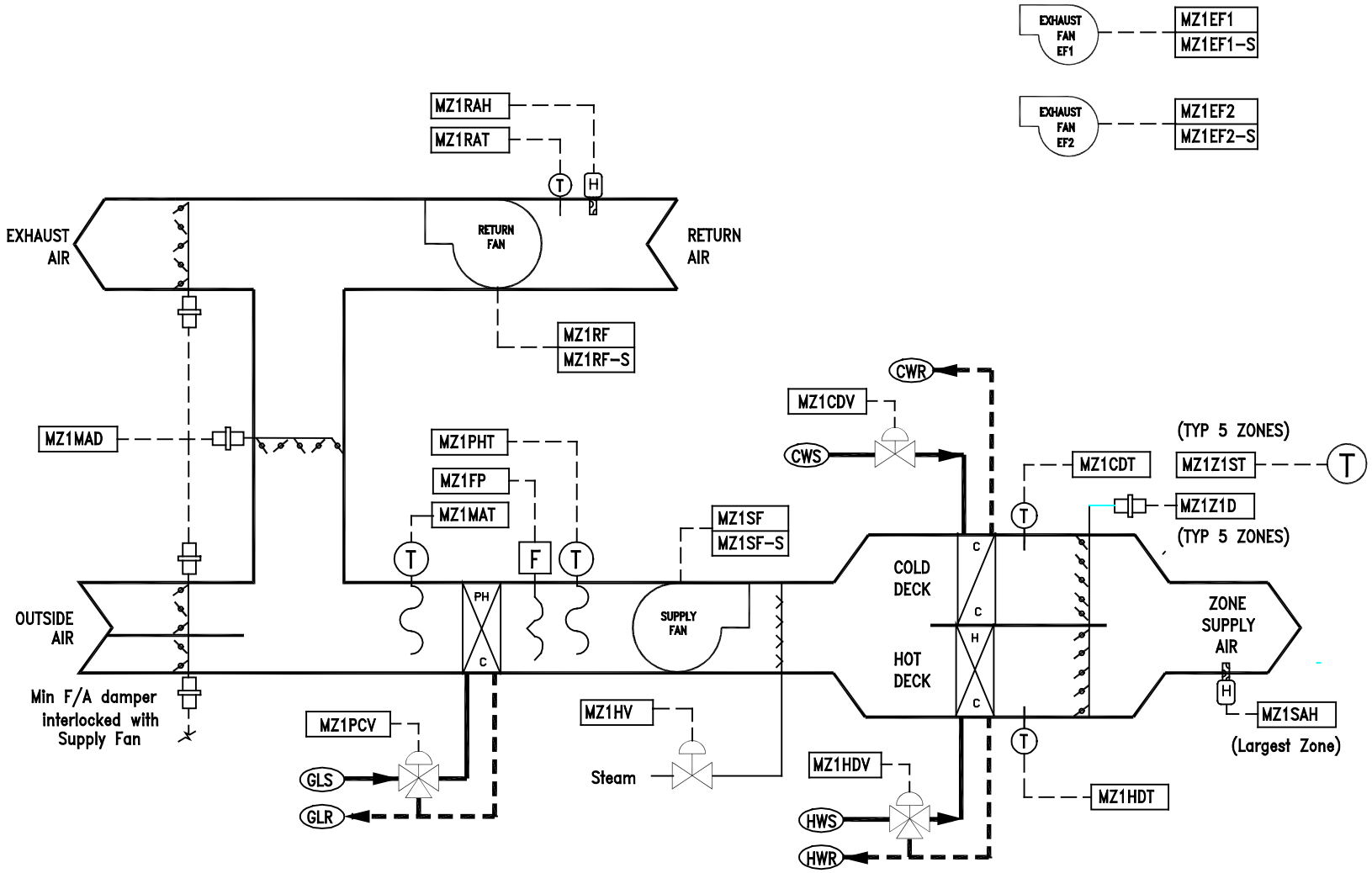
Building Name

System: AH1 (Air Handler No.1)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Supply Fan Start/Stop	AH1 SF	Penthouse		Ry			A	
2	Return Fan Start/Stop	AH1 RF	Penthouse		Ry			A	
3	Exhaust Fan 1 Start/Stop	AH1 EF1	Penthouse		Ry			A	
4	Exhaust Fan 2 Start/Stop	AH1 EF2	Penthouse		Ry			A	
5	Heating Coil Pump Start/Stop	AH1 HCP	Penthouse		Ry			A	
6	Humidifier Enable	AH1 H-E	Penthouse		Ry			A	Packaged controller
7	Fresh/Outdoor Air Damper	AH1 FAD	Penthouse		Ry			A	Minimum outdoor air
8	DX Cooling Stage 2	AH1 DX2	Penthouse		Ry			A	
9	DX Cooling Stage 1	AH1 DX1	Penthouse		Ry			A	
10	Supply Fan Status	AH1 SF-S	Penthouse	Ri				A	Ct status relay
11	Return Fan Status	AH1 RF-S	Penthouse	Ri				A	Ct status relay
12	Exhaust Fan 1 Status	AH1 EF1-S	Penthouse	Ri				A	Ct status relay
13	Exhaust Fan 2 Status	AH1 EF2-S	Penthouse	Ri				A	Ct status relay
14	Heating Coil Pump Status	AH1 HCP-S	Penthouse	Ri				A	Ct status relay
15	Humidifier Status	AH1 H-S	Penthouse	Ri				A	Packaged controller
16	Freeze Protect	AH1 FP	Penthouse	Dc				A	
17	Mixed Air Temperature	AH1 MAT	Penthouse			Ta		A	
18	Return Air Temperature	AH1 RAT	Penthouse			Tp		A	
19	Supply Air Temperature	AH1 SAT	Penthouse			Tp		A	
20	Supply Air Humidity	AH1 SAH	Penthouse			Hp		A	
21	Return Air Humidity	AH1 RAH	Penthouse			Hp		A	
22	Space Temperature 1	AH1 ST1	Main Floor			Tr		A	Courtroom
23	Space Temperature 2	AH1 ST2	Main Floor			Tr		A	South office
24	Space Temperature 3	AH1 ST3	Main Floor			Tr		A	East office
25	Space Temperature 4	AH1 ST4	Basement			Tr		A	Basement office
26	Mixed Air Dampers	AH1 MAD	Penthouse				Da	A	
27	Heating Coil Valve	AH1 HCV	Penthouse				Va	A	
28	Humidifier Setpoint Reset	AH1 H-R	Penthouse				Ao	A	Packaged controller
	Sub-Total (This System Only)			**7**	**9**	**9**	**3**		28 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU.
- An RCU can contain the points from more than one GROUP

18-Dec-02



SYSTEM TYPE: Multi-Zone

LOCATION: Penthouse Fan Room

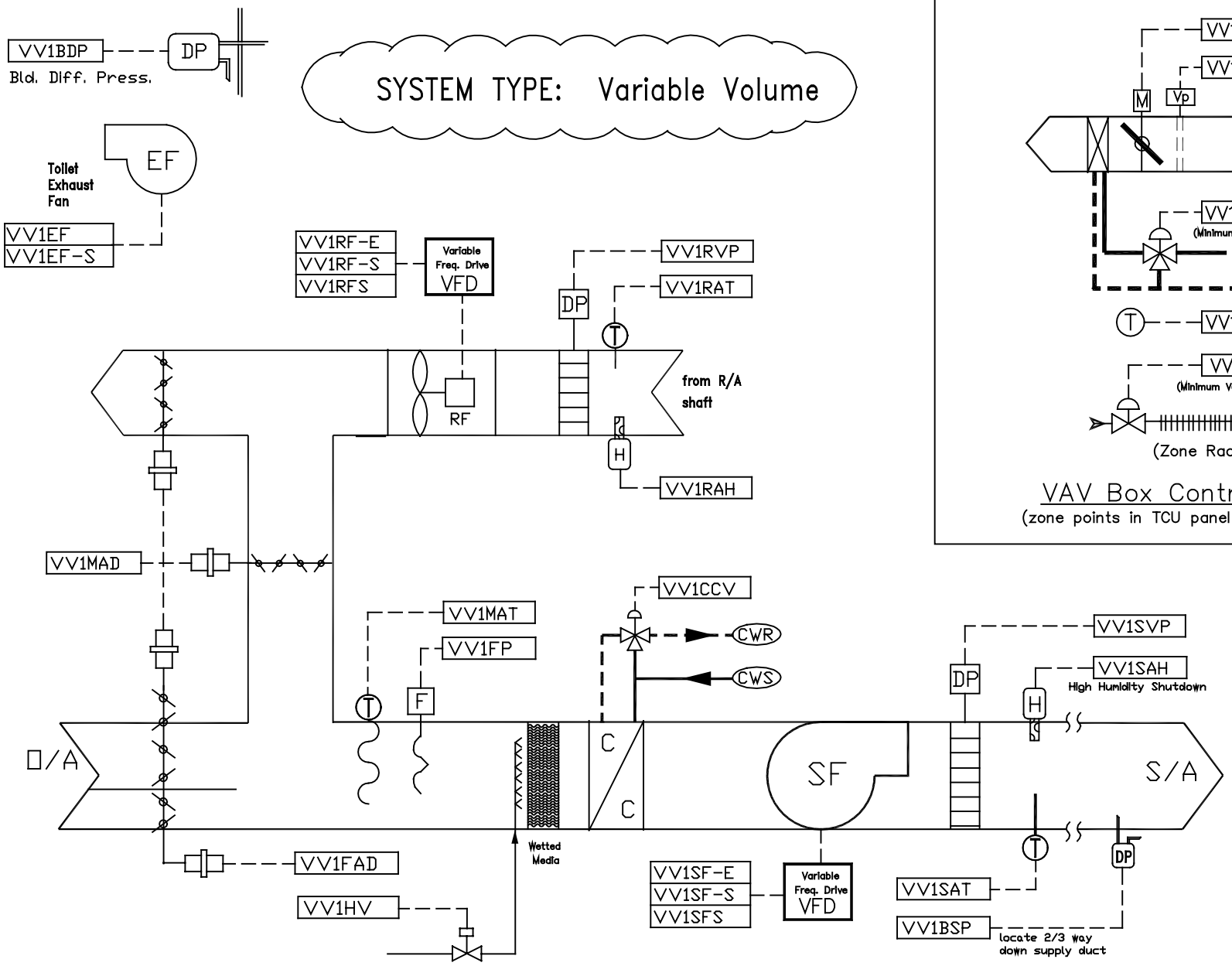
BID NO.: B00XXX	SECTION: 15941	Alberta Infrastructure	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ	DESCRIPTION:	DRAWING
SITE NO.: S00XXX	DRAWN BY: DC			Building Name EMCS – Multi-Zone MZ1	CSK-2
CENTRE CODE: XXXXX	CHK'D BY: RU				02-mz1.dwg
PROJ FILE NO: XXXXX	DATE: 09 JAN 02				PAGE 2 of 11
PLAN NO.: 00XXXX	SCALE: NTS				

System: MZ1 (Multi-Zone Air Handler No.1)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Supply Fan Start/Stop	MZ1 SF	Penthouse		Ry			E	
2	Return Fan Start/Stop	MZ1 RF	Penthouse		Ry			E	
3	Exhaust Fan 1 Start/Stop	MZ1 EF1	Penthouse		Ry			E	
4	Exhaust Fan 2 Start/Stop	MZ1 EF2	Penthouse		Ry			E	
5	Freeze Protect	MZ1 FP	Penthouse	Dc				E	
6	Supply Fan Status	MZ1 SF-S	Penthouse	Ri				E	Ct status relay
7	Return Fan Status	MZ1 RF-S	Penthouse	Ri				E	Ct status relay
8	Exhaust Fan 1 Status	MZ1 EF1-S	Penthouse	Ri				E	Ct status relay
9	Exhaust Fan 2 Status	MZ1 EF2-S	Penthouse	Ri				E	Ct status relay
10	Mixed Air Temperature	MZ1 MAT	Penthouse			Ta		E	
11	Pre-Heat Temperature	MZ1 PHT	Penthouse			Ta		E	
12	Return Air Temperature	MZ1 RAT	Penthouse			Tp		E	
13	Cold Deck Temperature	MZ1 CDT	Penthouse			Tp		E	
14	Hot Deck Temperature	MZ1 HDT	Penthouse			Tp		E	
15	Return Air Humidity	MZ1 RAH	Penthouse			Hp		E	
16	Supply Air Humidity	MZ1 SAH	Penthouse			Hp		E	Locate in largest zone duct
17	Mixed Air Dampers	MZ1 MAD	Penthouse				Da	E	
18	Pre-Heat Coil Valve	MZ1 PCV	Penthouse				Va	E	
19	Cold Deck Valve	MZ1 CDV	Penthouse				Va	E	
20	Hot Deck Valve	MZ1 HDV	Penthouse				Va	E	
21	Humidity Valve	MZ1 HV	Penthouse				Va	E	
22	Zone 1 Space Temperature	MZ1 Z1ST	Main floor			Tr		F	East office
23	Zone 2 Space Temperature	MZ1 Z2ST	Main floor			Tr		F	West office
24	Zone 3 Space Temperature	MZ1 Z3ST	Main floor			Tr		F	South interior zone
25	Zone 4 Space Temperature	MZ1 Z4ST	Main floor			Tr		F	North office
26	Zone 5 Space Temperature	MZ1 Z5ST	Main floor			Tr		F	North west office
27	Zone 1 Damper	MZ1 Z1D	Penthouse				Da	F	Zone damper
28	Zone 2 Damper	MZ1 Z2D	Penthouse				Da	F	Zone damper
29	Zone 3 Damper	MZ1 Z3D	Penthouse				Da	F	Zone damper
30	Zone 4 Damper	MZ1 Z4D	Penthouse				Da	F	Zone damper
31	Zone 5 Damper	MZ1 Z5D	Penthouse				Da	F	Zone damper
	Sub-Total (This System Only)			**5**	**4**	**12**	**10**		31 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU.
- An RCU can contain the points from more than one GROUP

18-Dec-02



VAV Box Control (Digital)

(zone points in TCU panel – Typ for 15 zones)

LOCATION: North Penthouse

BID NO.:	B00XXX	SECTION:	15941	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ	DESCRIPTION:
SITE NO.:	S00XXX	DRAWN BY:	DC		Building Name EMCS – Variable Volume VV1
CENTRE CODE:	XXXXX	CHK'D BY:	RU		DRAWING CSK-3 03-vv1.dwg
PROJ FILE NO:	XXXXX	DATE:	09 JAN 02		
PLAN NO.:	00XXXX	SCALE:	NTS		PAGE 3 of 11

Alberta INFRASTRUCTURE

System: VV1 (Variable Volume Air Handler No.1)

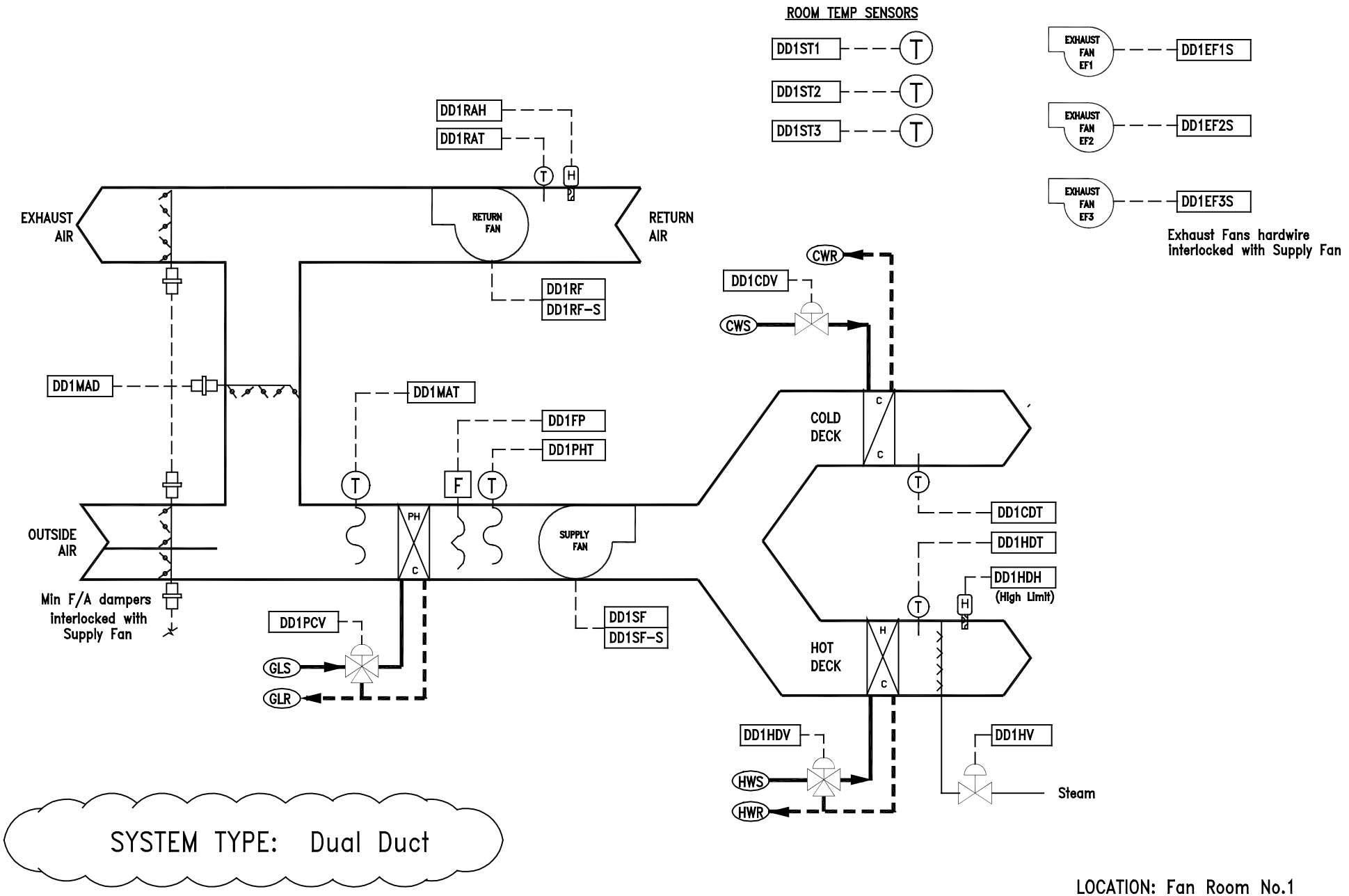
No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Supply Fan Enable	VV1 SF-E	N. Penthouse		Ry			C	Speed drive
2	Return Fan Enable	VV1 RF-E	N. Penthouse		Ry			C	Speed drive
3	Exhaust Fan Start/Stop	VV1 EF	N. Penthouse		Ry			C	Toilet exhaust
4	Humifier Valve	VV1 HV	N. Penthouse		Ry			C	Wetted media
5	Fresh/Outdoor Air Damper	VV1 FAD	N. Penthouse		Ry			C	
6	Supply Fan Status	VV1 SF-S	N. Penthouse	Dc				C	Dry contact in speed drive
7	Return Fan Status	VV1 RF-S	N. Penthouse	Dc				C	Dry contact in speed drive
8	Exhaust Fan Status	VV1 EF-S	N. Penthouse	Ri				C	Ct status relay
9	Freeze Protect	VV1 FP	N. Penthouse	Dc				C	
10	Mixed Air Temperature	VV1 MAT	N. Penthouse			Ta		C	
11	Supply Air Temperature	VV1 SAT	N. Penthouse			Tp		C	
12	Return Air Temperature	VV1 RAT	N. Penthouse			Tp		C	
13	Supply Velocity Pressure	VV1 SVP	N. Penthouse			Vp		C	
14	Return Velocity Pressure	VV1 RVP	N. Penthouse			Vp		C	
15	Branch Static Pressure	VV1 BSP	N. Penthouse			Sp		C	
16	Return Air Humidity	VV1 RAH	N. Penthouse			Hp		C	
17	Supply Air Humidity	VV1 SAH	N. Penthouse			Hp		C	
18	Building Differential Pressure	VV1 BDP	N. Penthouse			Sp		C	Outdoor reference
19	Mixed Air Dampers	VV1 MAD	N. Penthouse				Da	C	
20	Cooling Coil Valve	VV1 CCV	N. Penthouse				Va	C	
21	Return Fan Speed	VV1 RFS	N. Penthouse				Ao	C	Speed drive
22	Supply Fan Speed	VV1 SFS	N. Penthouse				Ao	C	Speed drive
	Sub-Total (This System Only)			**4**	**5**	**9**	**4**		22 points this system

VAV BOX CONTROL POINTS (TYPICAL for 15 Zones - Refer to mechanical drawings for locations) Zone ## (01-15)

1	Space Temperature	VV1 B##1ST	See floor plans			Tr		TCU##	
2	VAV Box Supply Velocity Pressure	VV1 B##SVP	See floor plans			Vp		TCU##	
3	VAV Box Damper	VV1 B##D	See floor plans				Da	TCU##	
4	ReHeat Coil Valve	VV1 B##RCV	See floor plans				Va	TCU##	
5	Perimeter Radiation Valve	VV1 B##PRV	See floor plans				Va	TCU##	
	Sub-Total (per Zone)			**0**	**0**	**2**	**3**		5 points per zone

NOTE: - Points with the same GROUP designation must be located together in the same RCU.
- An RCU can contain the points from more than one GROUP

18-Dec-02

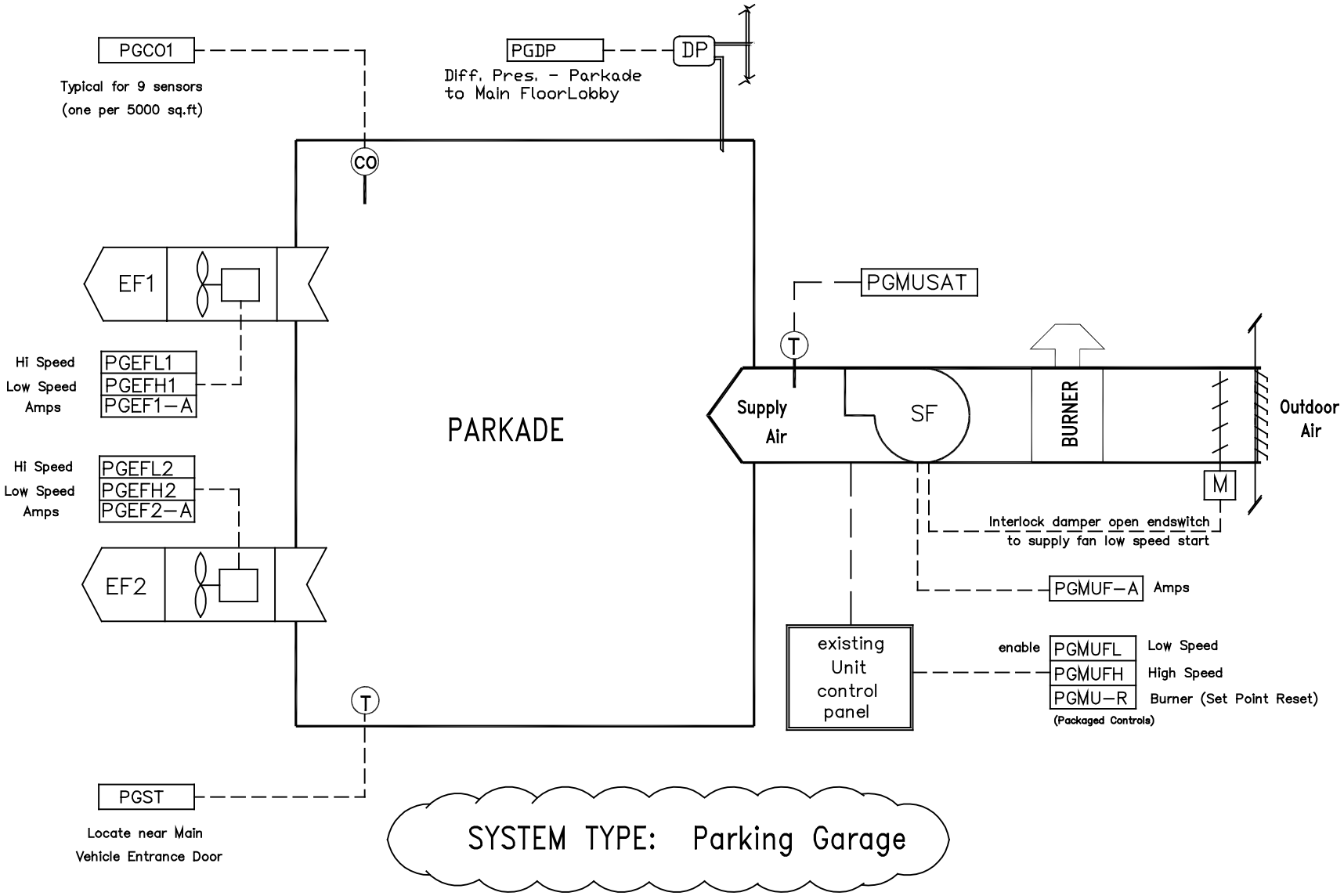


BID NO.:	B00XXX	SECTION:	15941	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ	DESCRIPTION:
SITE NO.:	S00XXX	DRAWN BY:	DC		Building Name EMCS – Dual Duct DD1
CENTRE CODE:	XXXXX	CHK'D BY:	RU		DRAWING CSK-4 04-dd1.dwg
PROJ FILE NO:	XXXXX	DATE:	10 JAN 02		
PLAN NO.:	00XXXX	SCALE:	NTS		PAGE 4 of 11

System: DD1 (Dual Duct Air Handler No.1)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Supply Fan Start/Stop	DD1 SF	Fan Room No.1		Ry			D	
2	Return Fan Start/Stop	DD1 RF	Fan Room No.1		Ry			D	
3	Return Fan Status	DD1 RF-S	Fan Room No.1	Ri				D	Ct status relay
4	Supply Fan Status	DD1 SF-S	Fan Room No.1	Ri				D	Ct status relay
5	Exhaust Fan 1 Status	DD1 EF1-S	Fan Room No.1	Ri				D	Ct status relay
6	Exhaust Fan 2 Status	DD1 EF2-S	Fan Room No.1	Ri				D	Ct status relay
7	Exhaust Fan 3 Status	DD1 EF3-S	Fan Room No.1	Ri				D	Ct status relay
8	Freeze Protect	DD1 FP	Fan Room No.1	Dc				D	Tie into hardwire freeze stat
9	Mixed Air Temperature	DD1 MAT	Fan Room No.1			Ta		D	
10	Pre-Heat Temperature	DD1 PHT	Fan Room No.1			Ta		D	
11	Return Air Temperature	DD1 RAT	Fan Room No.1			Tp		D	
12	Cold Deck Temperature	DD1 CDT	Fan Room No.1			Tp		D	
13	Hot Deck Temperature	DD1 HDT	Fan Room No.1			Tp		D	
14	Return Air Humidity	DD1 RAH	Fan Room No.1			Hp		D	
15	Hot Deck Humidity	DD1 HDH	Fan Room No.1			Hp		D	Software interlock high limit
16	Mixed Air Dampers	DD1 MAD	Fan Room No.1				Da	D	
17	Pre-Heat Coil Valve	DD1 PCV	Fan Room No.1				Va	D	
18	Cold Deck Valve	DD1 CDV	Fan Room No.1				Va	D	
19	Hot Deck Valve	DD1 HDV	Fan Room No.1				Va	D	
20	Humidity Valve	DD1 HV	Fan Room No.1				Va	D	
21	Space Temperature 1	DD1 ST1	Main floor			Tr		D	East office
22	Space Temperature 2	DD1 ST2	Main floor			Tr		D	West office
23	Space Temperature 3	DD1 ST3	Main floor			Tr		D	Interior zone
	Sub-Total (This System Only)			**6**	**2**	**10**	**5**		23 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU. 18-Dec-02
- An RCU can contain the points from more than one GROUP



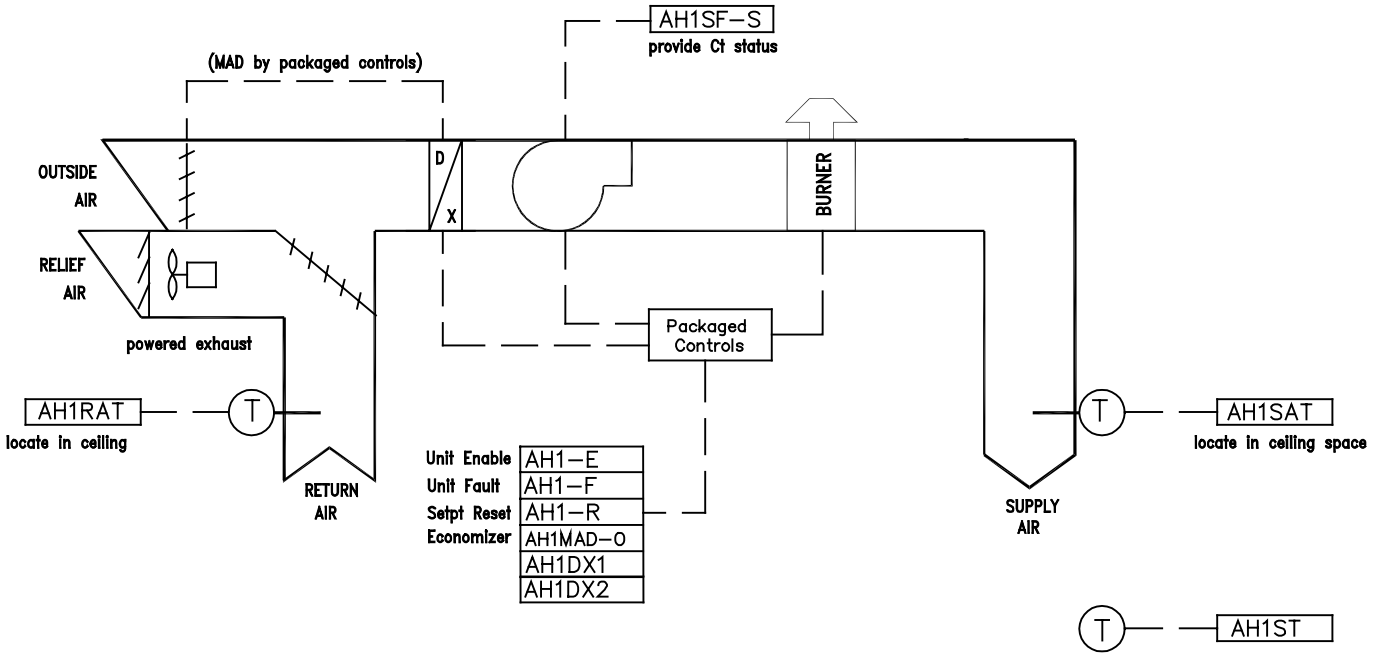
BID NO.:	B00XXX	SECTION:	15941	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ	DESCRIPTION: Building Name EMCS – Parking Garage
SITE NO.:	S00XXX	DRAWN BY:	DC		DRAWING CSK-5 05-pv.dwg
CENTRE CODE:	XXXXX	CHK'D BY:	RU		
PROJ FILE NO:	XXXXX	DATE:	10 JAN 02		
PLAN NO.:	00XXXX	SCALE:	NTS		PAGE 5 of 11

System: PG (Parking Garage)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Make-Up Unit Fan Low Speed	PG MUFL	N. Penthouse		Ry			C	Interlock with damper
2	Make-Up Unit Fan High Speed	PG MUFH	N. Penthouse		Ry			C	
3	Exhaust Fan 1 Low Speed	PG EFL1	N. Penthouse		Ry			C	Parkade exhaust
4	Exhaust Fan 1 High Speed	PG EFH1	N. Penthouse		Ry			C	
5	Exhaust Fan 2 Low Speed	PG EFL2	N. Penthouse		Ry			C	Parkade exhaust
6	Exhaust Fan 2 High Speed	PG EFH2	N. Penthouse		Ry			C	
7	Exhaust Fan 1 Status	PG EF1-A	N. Penthouse			Ct		C	Motor current
8	Exhaust Fan 2 Status	PG EF2-A	N. Penthouse			Ct		C	Motor current
9	Make-Up Unit Fan Amps	PG MUF-A	N. Penthouse			Ct		C	Motor current
10	Make-Up Unit Supply Air Temp.	PG MUSAT	N. Penthouse			Tp		C	
11	Differential Pressure	PG DP	N. Penthouse			Sp		C	Reference parkade to lobby
12	Make-Up Unit Supply SetPoint Reset	PG MU-R	N. Penthouse				Ao	C	Packaged controls
13	CO2 Sensor No.1	PG C01	Parkade Level P1			CO		C	Refer to floor plan
14	CO2 Sensor No.2	PG C02	Parkade Level P1			CO		C	Refer to floor plan
15	CO2 Sensor No.3	PG C03	Parkade Level P1			CO		C	Refer to floor plan
16	CO2 Sensor No.4	PG C04	Parkade Level P2			CO		C	Refer to floor plan
17	CO2 Sensor No.5	PG C05	Parkade Level P2			CO		C	Refer to floor plan
18	CO2 Sensor No.6	PG C06	Parkade Level P2			CO		C	Refer to floor plan
19	CO2 Sensor No.7	PG C07	Parkade Level P3			CO		C	Refer to floor plan
20	CO2 Sensor No.8	PG C08	Parkade Level P3			CO		C	Refer to floor plan
21	CO2 Sensor No.9	PG C09	Parkade Level P3			CO		C	Refer to floor plan
22	Space Temperature	PG ST	Parkade Level P1			Tr		C	Locate near vehicle door
	Sub-Total (This System Only)			**0**	**6**	**15**	**1**		22 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU.
- An RCU can contain the points from more than one GROUP

18-Dec-02



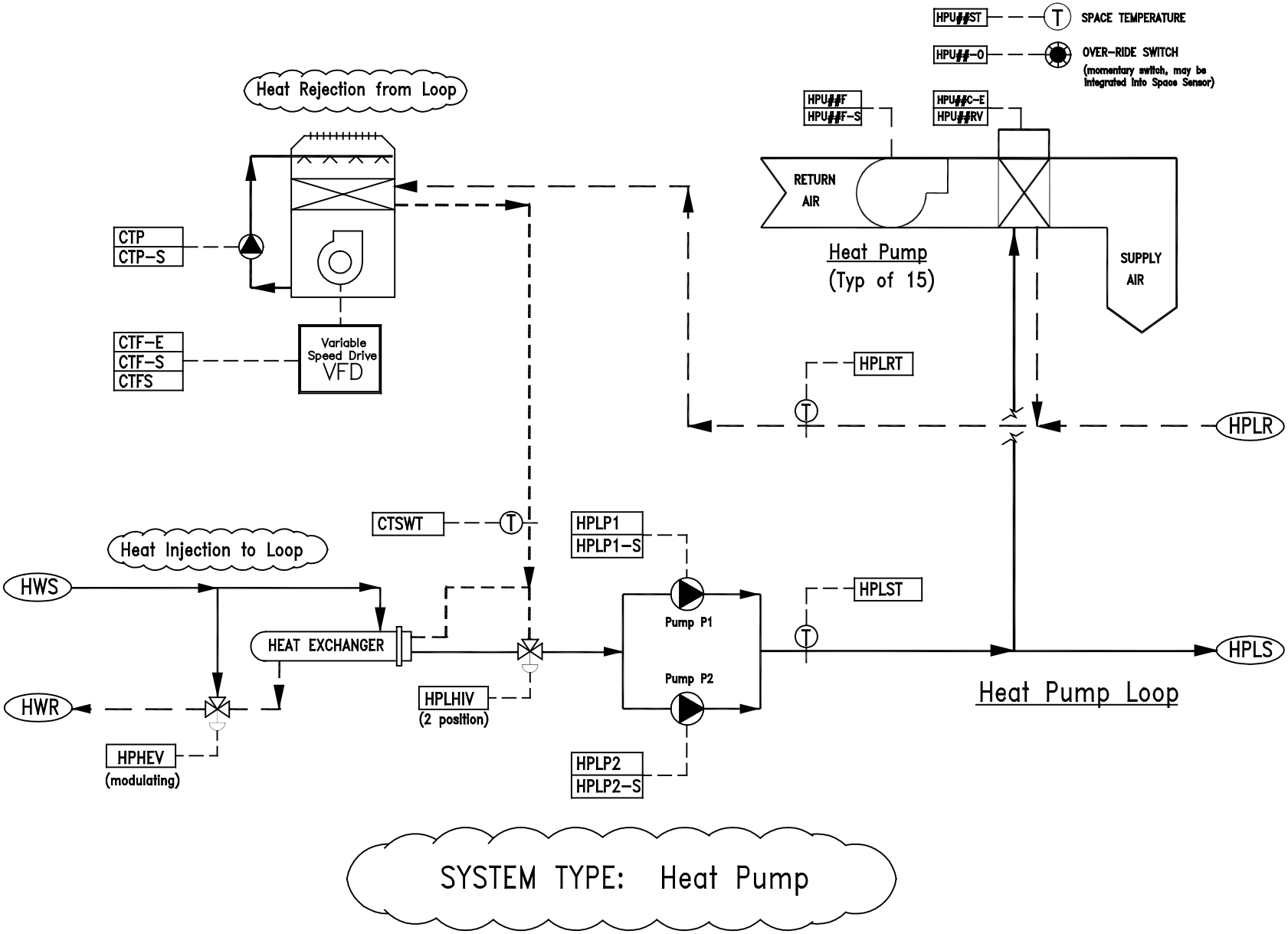
SYSTEM TYPE: Roof Top Unit

BID NO.: B00XXX	SECTION: 15941	Alberta INFRASTRUCTURE	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ	DESCRIPTION:	DRAWING
SITE NO.: S00XXX	DRAWN BY: DC			Building Name EMCS – Roof Top Unit (Packaged Controls)	CSK–6
CENTRE CODE: XXXXX	CHK'D BY: RU				06–rtu.dwg
PROJ FILE NO: XXXXX	DATE: 10 JAN 02				PAGE 6 of 11
PLAN NO.: 00XXXX	SCALE: NTS				

System: AH1 (Roof Top Unit with Packaged Controls)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	RTU 1 Enable	AH1 -E	Roof		Ry			B	Connect to packaged controls
2	RTU Mix Dampers Econo Override	AH1 MAD-O	Roof		Ry			B	Connect to packaged controls
3	RTU DX Cooling Stage 1	AH1 DX1	Roof		Ry			B	Packaged controls (DX cooling)
4	RTU DX Cooling Stage 2	AH1 DX2	Roof		Ry			B	Packaged controls (DX cooling)
5	RTU 1 Fan Status	AH1 SF-S	Roof	Ri				B	Provide CT status relay on fan
6	RTU 1 Fault	AH1 -F	Roof	Dc				B	Unit alam contact
7	Supply Air Temperature	AH1 SAT	Ceiling			Tp		B	Locate in ceiling ductwork
8	Return Air Temperature	AH1 RAT	Ceiling			Tp		B	Locate in ceiling ductwork
9	Space Temperature	AH1 ST	Room 205			Tr		B	See floor plan for location
10	RTU Supply Air SetPoint Reset	AH1 -R	Roof				Ao	B	Connect to packaged controls
	Sub-Total (This System Only)			**2**	**4**	**3**	**1**		10 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU. 18-Dec-02
- An RCU can contain the points from more than one GROUP



BID NO.:	B00XXX	SECTION:	15941	Alberta INFRASTRUCTURE	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ
SITE NO.:	S00XXX	DRAWN BY:	DC		
CENTRE CODE:	XXXXX	CHK'D BY:	RU		
PROJ FILE NO:	XXXXX	DATE:	13 JAN 02		
PLAN NO.:	00XXXX	SCALE:	NTS		

DESCRIPTION:	DRAWING
Building Name EMCS – Heat Pump Loop	CSK-7 07-hp.dwg PAGE 7 of 11

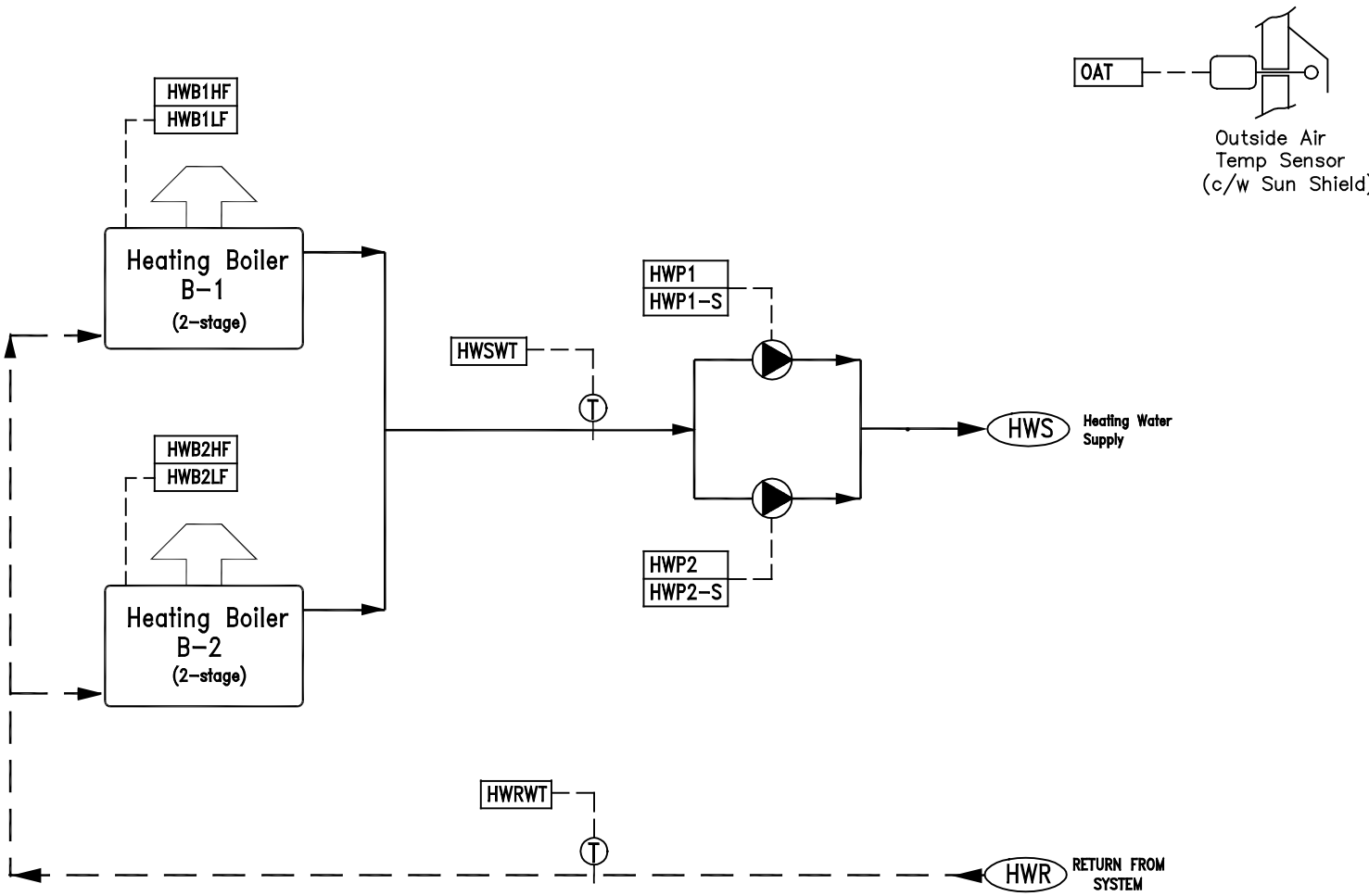
System: HP (Water Source Heat Pump)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Loop Pump 1 Start/Stop	HP LP1	Penthouse		Ry			M	Lead/Lag with P1
2	Loop Pump 2 Start/Stop	HP LP2	Penthouse		Ry			M	Lead/Lag with P2
3	Loop Heat Injection Valve	HP LHIV	Penthouse		Ry			M	Two position valve
4	Loop Pump 1 Status	HP P1-S	Penthouse	Ri				M	Ct status relay
5	Loop Pump 2 Status	HP P2-S	Penthouse	Ri				M	Ct status relay
6	Loop Supply Temperature	HP LST	Penthouse			Tw		M	
7	Loop Return Temperature	HP LRT	Penthouse			Tw		M	
8	Heat Exchanger Valve	HP HEV	Penthouse				Ao	M	
9	Cooling Tower Pump Start/Stop	CT P	Penthouse		Ry			M	
10	Cooling Tower Fan Enable	CT F-E	Penthouse		Ry			M	Speed drive
11	Cooling Tower Pump Status	CT P-S	Penthouse	Ri				M	
12	Cooling Tower Fan Status	CT F-S	Penthouse	Dc				M	Dry contact in speed drive
13	Cooling Tower Supply Water Temp	CT SWT	Penthouse			Tw		M	
14	Cooling Tower Fan Speed	CT FS	Penthouse				Ao	M	Speed drive
	Sub-Total (This System Only)			**4**	**5**	**3**	**2**		14 points this system

HEAT PUMP UNIT CONTROL POINTS (TYPICAL for 15 Zones - Refer to mechanical drawings for locations) Zone ## (01-15)

1	Unit 1 Compressor Enable	HP U##C-E	Ceiling space		Ry			TCU##	Compressor lock-out
2	Unit 1 Fan Start/Stop	HP U##F	Ceiling space		Ry			TCU##	
3	Unit 1 Reversing Valve	HP U##RV	Ceiling space		Ry			TCU##	Heat/Cool mode
4	Unit 1 Occupancy Override	HP U##-O	Room 101	Mc				TCU##	Momentary contact push button
5	Unit 1 Fan Status	HP U##F-S	Ceiling space	Ri				TCU##	Ct status relay
6	Unit 1 Space Temperature	HP U##ST	Room 101			Tr		TCU##	
	Sub-Total (This System Only)			**2**	**3**	**1**	**0**		6 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU. 18-Dec-02
- An RCU can contain the points from more than one GROUP



SYSTEM TYPE: Heating Water
Atmoshperic Boilers (Natural Draft)

LOCATION: Boiler Room

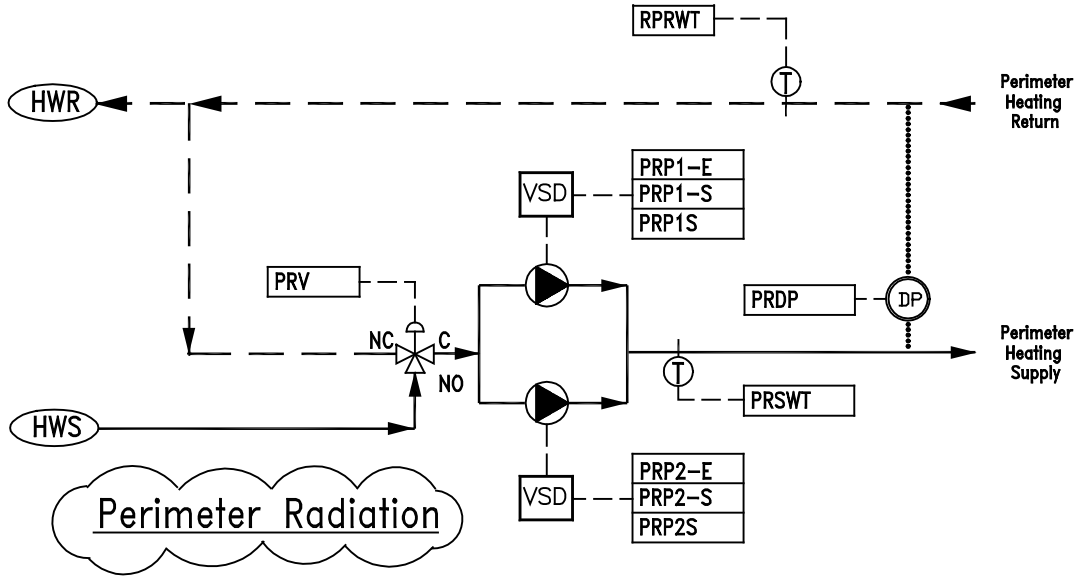
BID NO.:	B00XXX	SECTION:	15941	Alberta INFRASTRUCTURE	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ
SITE NO.:	S00XXX	DRAWN BY:	DC		
CENTRE CODE:	XXXXX	CHK'D BY:	RU		
PROJ FILE NO:	XXXXX	DATE:	11 JAN 02		
PLAN NO.:	00XXXX	SCALE:	NTS		

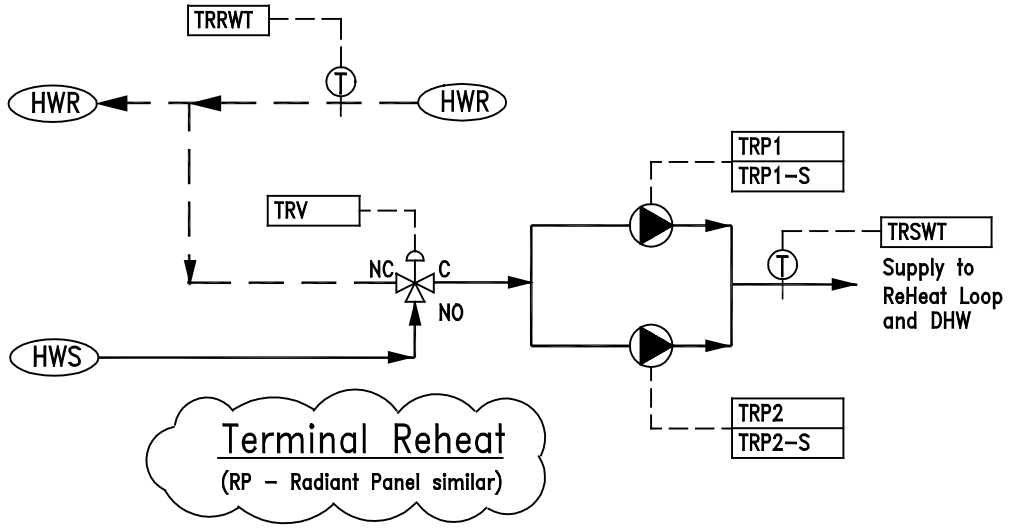
DESCRIPTION:	DRAWING
Building Name EMCS – Heating Water Atmoshpheric Boilers	CSK-8 08-hw-a.dwg PAGE 8 of 11

System: HW (Hot Water Heating System - Atmospheric Boilers)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Boiler 1 Low Fire	HW B1LF	Boiler Rm.		Ry			A	2 stage burner
2	Boiler 1 High Fire	HW B1HF	Boiler Rm.		Ry			A	2 stage burner
3	Boiler 2 Low Fire	HW B2LF	Boiler Rm.		Ry			A	2 stage burner
4	Boiler 2 High Fire	HW B2HF	Boiler Rm.		Ry			A	2 stage burner
5	Heating Pump 1 Start/Stop	HW P1	Boiler Rm.		Ry			A	
6	Heating Pump 1 Status	HW P1-S	Boiler Rm.	Ri				A	Ct status relay
7	Heating Pump 2 Start/Stop	HW P2	Boiler Rm.		Ry			A	
8	Heating Pump 2 Status	HW P2-S	Boiler Rm.	Ri				A	Ct status relay
9	Return Water Temperature	HW RWT	Boiler Rm.			Tw		A	
10	Supply Water Temperature	HW SWT	Boiler Rm.			Tw		A	
11	Outside Air Temperature	OAT	North Exposure			To		A	Note 4: Sun Shield
	Sub-Total (This System Only)			**2**	**6**	**3**	**0**		11 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU. 18-Dec-02
- An RCU can contain the points from more than one GROUP





LOCATION: Boiler Room

BID NO.: B00XXX	SECTION: 15941	Alberta INFRASTRUCTURE	Consultant Name Address - Line 1 Address - Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ	DESCRIPTION:	DRAWING
SITE NO.: S00XXX	DRAWN BY: DC			Building Name EMCS - Heating Water Secondary Systems	CSK-9
CENTRE CODE: XXXXX	CHK'D BY: RU				9-hss.dwg
PROJ FILE NO: XXXXX	DATE: 11 JAN 02				PAGE 9 of 11
PLAN NO.: 00XXXX	SCALE: NTS				

Building Name

Points Schedules - Section 15941 **Page 9a of 11**

System: PR (Perimeter Radiation)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Pump 1 Enable	PR P1-E	Boiler Rm.		Ry			A	Speed drive
2	Pump 1 Status	PR P1-S	Boiler Rm.	Dc				A	Dry contact in speed drive
3	Pump 1 Speed	PR P1S	Boiler Rm.				Ao	A	Speed drive
4	Pump 2 Enable	PR P2-E	Boiler Rm.		Ry			A	Speed drive
5	Pump 2 Status	PR P2-S	Boiler Rm.	Dc				A	Dry contact in speed drive
6	Pump 2 Speed	PR P1S	Boiler Rm.				Ao	A	Speed drive
7	Supply Water Temperature	PR SWT	Boiler Rm.			Tw		A	
8	Return Water Temperature	PR RWT	Boiler Rm.			Tw		A	
9	Differential Pressure	PR DP	Boiler Rm.			Dp		A	Vary pump speed to maintain DP
10	Control Valve	PR V	Boiler Rm.				Va	A	
	Sub-Total (This System Only)			**2**	**2**	**3**	**3**		10 points this system

Building Name

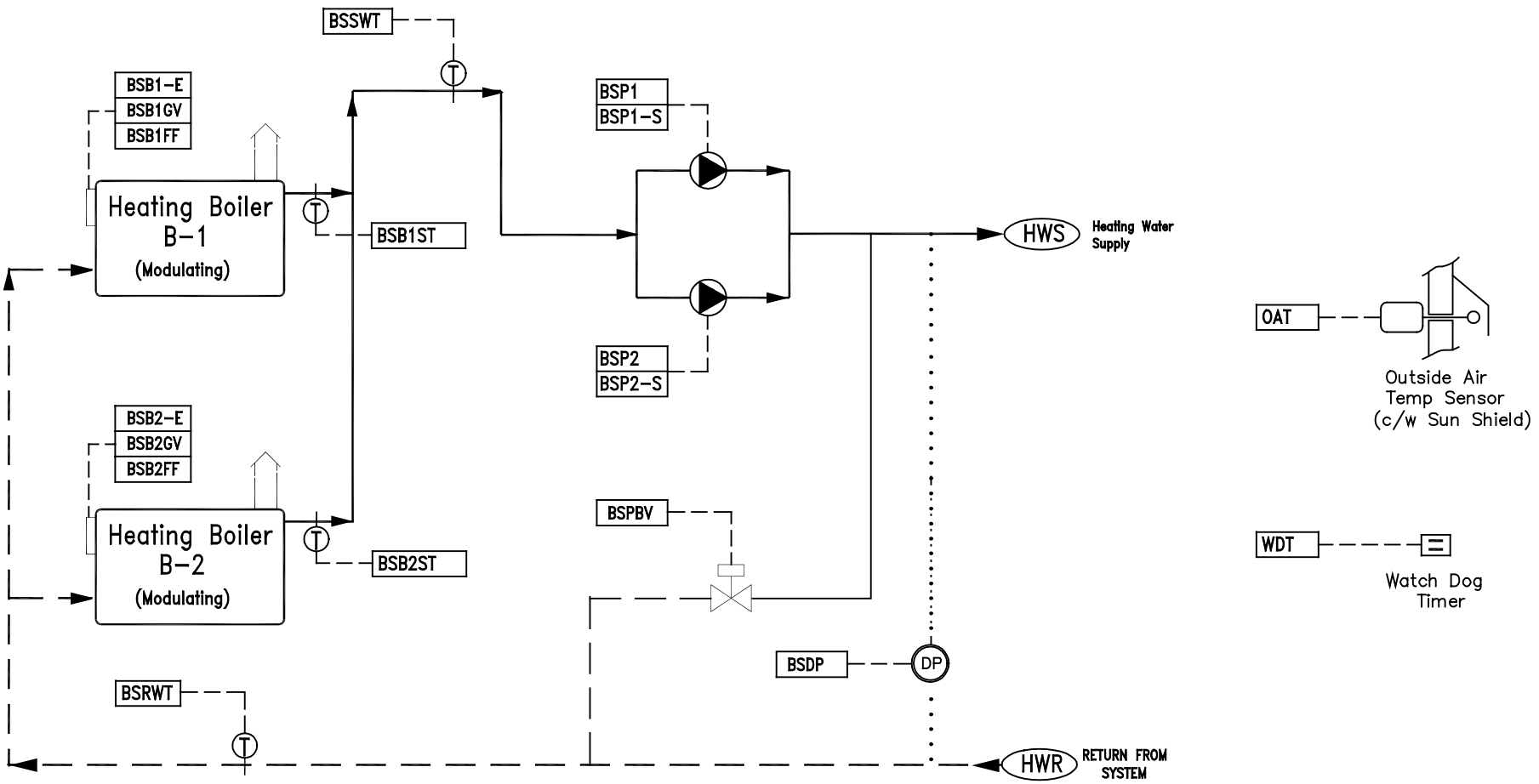
Points Schedules - Section 15941 **Page 9b of 11**

System: TR (Terminal ReHeat)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Pump 1 Start/Stop	TR P1	Boiler Rm.		Ry			B	
2	Pump 1 Status	TR P1-S	Boiler Rm.	Ri				B	Ct status relay
3	Pump 2 Start/Stop	TR P2	Boiler Rm.		Ry			B	
4	Pump 2 Status	TR P2-S	Boiler Rm.	Ri				B	Ct status relay
5	Supply Water Temperature	TR SWT	Boiler Rm.			Tw		B	
6	Return Water Temperature	TR RWT	Boiler Rm.			Tw		B	
7	Control Valve	TR V	Boiler Rm.				Va	B	
	Sub-Total (This System Only)			**2**	**2**	**2**	**1**		7 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU.
- An RCU can contain the points from more than one GROUP

18-Dec-02



SYSTEM TYPE: Boilers (forced draft)

LOCATION: Boiler Room

BID NO.: B00XXX	SECTION: 15941	Alberta INFRASTRUCTURE	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ	DESCRIPTION:	DRAWING
SITE NO.: S00XXX	DRAWN BY: DC			Building Name EMCS – Heating Water Forced Draft Boilers	CSK-10
CENTRE CODE: XXXXX	CHK'D BY: RU				10-hw-fd.dwg
PROJ FILE NO: XXXXX	DATE: 11 JAN 01				PAGE 10 of 11
PLAN NO.: 00XXXX	SCALE: NTS				

System: BS (Boiler System)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Boiler 1 Enable	BS B1-E	Boiler Rm.		Ry			A	
2	Boiler 1 Flame Failure	BS B1FF	Boiler Rm.	Dc				A	Wire to common alarm contact
3	Boiler 1 Gas Valve	BS B1GV	Boiler Rm.				Ao	A	
4	Boiler 1 Supply Temperature	BS B1ST	Boiler Rm.			Tw		A	
5	Boiler 2 Enable	BS B2-E	Boiler Rm.		Ry			A	
6	Boiler 2 Flame Failure	BS B2FF	Boiler Rm.	Dc				A	Wire to common alarm contact
7	Boiler 2 Gas Valve	BS B2GV	Boiler Rm.				Ao	A	
8	Boiler 2 Supply Temperature	BS B2ST	Boiler Rm.			Tw		A	
9	Differential Pressure	BS DP	Boiler Rm.			Dp		A	
10	Pressure By-Pass Valve	BS PBV	Boiler Rm.				Va	A	Head Pressure Bypass
11	Pump 1 Start/Stop	BS P1	Boiler Rm.		Ry			A	
12	Pump 1 Status	BS P1-S	Boiler Rm.	Ri				A	Ct status relay
13	Pump 2 Start/Stop	BS P2	Boiler Rm.		Ry			A	
14	Pump 2 Status	BS P2-S	Boiler Rm.	Ri				A	Ct status relay
15	Supply Water Temperature	BS SWT	Boiler Rm.			Tw		A	
16	Return Water Temperature	BS RWT	Boiler Rm.			Tw		A	
17	Outside Air Temperature	OAT	North Exposure			To		A	Note 4: (Sun Shield)
	Sub-Total (This System Only)			**4**	**4**	**6**	**3**		17 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU.
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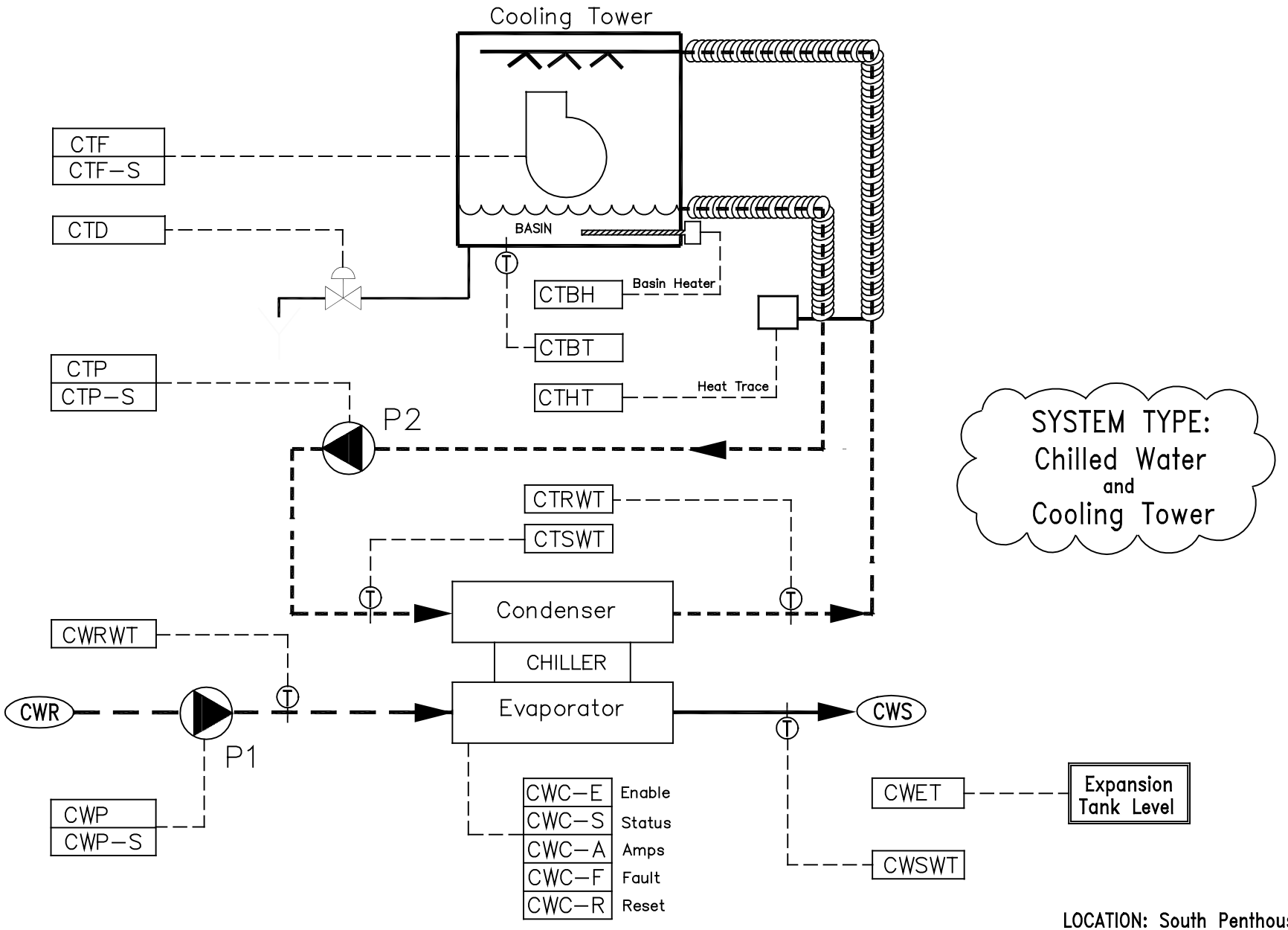
18-Dec-02



BID NO.:	B00XXX	SECTION:	15941	Consultant Name Address – Line 1 Address – Line 2 Tel: (780) XXX-YYYY Fax: (780) XXX-YYYZ	DESCRIPTION:
SITE NO.:	S00XXX	DRAWN BY:	DC		Building Name EMCS: Chilled Water – CW Cooling Tower – CT
CENTRE CODE:	XXXXX	CHK'D BY:	RU		
PROJ FILE NO:	XXXXX	DATE:	11 JAN 02		
PLAN NO.:	00XXXX	SCALE:	NTS		

DRAWING
CSK–11
11–cw.dwg
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Building Name

Points Schedules - Section 15941 **Page 11a of 11**

System: CW (Chilled Water & Cooling Tower)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Chiller Enable	CW C-E	South Penthouse		Ry			F	
2	Chiller Status	CW C-S	South Penthouse	Dc				F	From chiller controls package
3	Chiller Fault	CW C-F	South Penthouse	Dc				F	From chiller controls package
4	Chiller Current Draw (Amps)	CW C-A	South Penthouse			Ct		F	
5	Chiller SWT Setpoint Reset	CW C-R	South Penthouse				Ao	F	
6	Pump 1 Start/Stop	CW P1	South Penthouse		Ry			F	
7	Pump 1 Status	CW P1-S	South Penthouse	Ri				F	Ct status relay
8	Expansion Tank	CW ET	South Penthouse	Dc				F	Provide level switch
9	Return Water Temp	CW RWT	South Penthouse			Tw		F	
10	Supply Water Temp	CW SWT	South Penthouse			Tw		F	
	Sub-Total (This System Only)			**4**	**2**	**3**	**1**		10 points this system

Building Name

Points Schedules - Section 15941 **Page 11b of 11**

System: CT (Cooling Tower)

No.	Description	Label	Location	DI	DO	AI	AO	Group	Remarks / Notes
1	Fan Start/Stop	CT F	South Penthouse		Ry			F	
2	Fan Status	CT F-S	South Penthouse	Ri				F	Ct status relay
3	Dump Valves	CT D	South Penthouse		Ry			F	
4	Heat Trace	CT HT	South Penthouse		Ry			F	Cycle based on OAT
5	Sump Heater	CT SH	South Penthouse		Ry			F	Electric
6	Pump Start/Stop	CT P	South Penthouse		Ry			F	
7	Pump Status	CT P-S	South Penthouse	Ri				F	Ct status relay
8	Basin Temperature	CT BT	South Penthouse			Tw		F	
9	Supply Water Temperature	CT SWT	South Penthouse			Tw		F	
10	Return Water Temperature	CT RWT	South Penthouse			Tw		F	
	Sub-Total (This System Only)			**2**	**5**	**3**	**0**		10 points this system

NOTE: - Points with the same GROUP designation must be located together in the same RCU.
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18-Dec-02