

Obtaining and Maintaining Accurate Asset Inventories

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Construction Engineering Research Lab

13-Nov-13



US Army Corps
of Engineers®



Note:

While specific commercial products are listed in this presentation that does not constitute an endorsement of these products by the United States Government.



obtaining









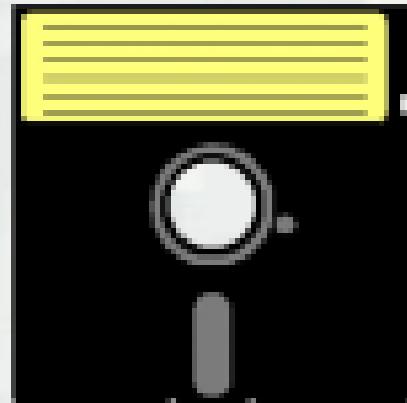


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maintaining

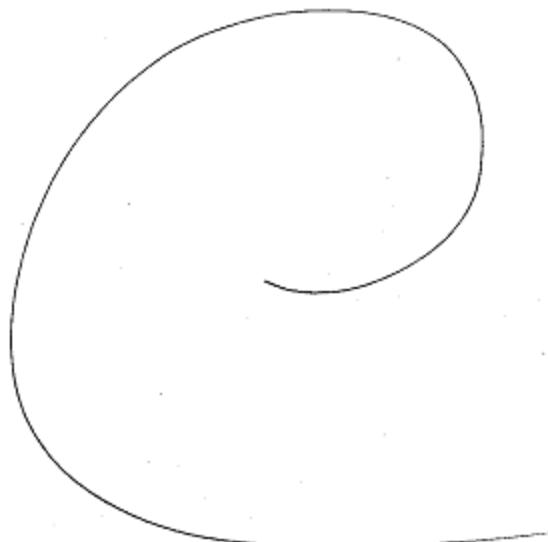


Facilities Management Services

UP Work Order: 2950784

Reported by: [REDACTED]	Reported: 1/16/2009		
Department: FMS	Work Type: UP		
Phone: [REDACTED]	Charge: [REDACTED]		
Location: MI [REDACTED]	Room: EQUIP RM		
Work Needed: 1/15 - unit going off on freeze - steam wing heater leaking. Need MI a/c and s/f to check. Left Don [REDACTED] a note.			
Assignments	Shop/Crew: MI	Manager: [REDACTED]	Assigned to: [REDACTED]
	Craft: AC		
Schedule	Start	Completion	Status: INPRG
Requested:			As of: 1/16/2009

Notes:



Akcamete, A. (2011). A formal approach for managing facility change information and capturing change history as part of building information models(BIMs). *Dissertation Abstracts International*, 73(09).

ERDC



“who has the keys?”

janitor's closet or medicine prep

**“I wonder why it
smells weird in this
room?”**

storage room or bioengineering lab

**“I wonder why the
floor is bouncy
corridor?”**

office or x-ray film storage



problem



unusable



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unusable



inaccessible



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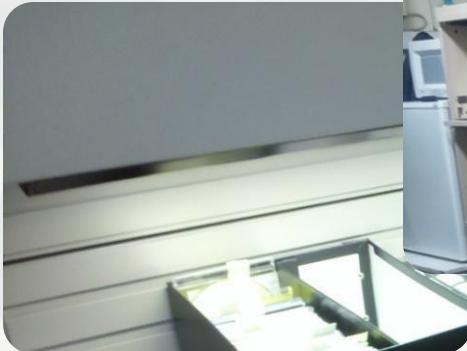
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unusable



inaccessible



obsolete



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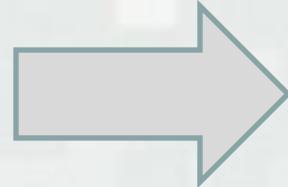
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unusable



inaccessible



obsolete



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unusable



inaccessible



unspecified rqmts

Facilities Management Services	
Reported by:	UP Work Order: 228754
Department:	Reported: 11/16/2009
Phone:	UP
Location:	Charge:
Work Needed:	Room:
115 - wall going off on there - means using ladder/stepl. Need MI's aid if to check. Left Dan	
Assignments:	ShopCrew: ME Manager: Assigned to:
Schedule:	Start Completion
Requested:	Status: DTRG As of: 11/16/2009
Notes:	

obsolete



NEVER FORGET



unusable



inaccessible



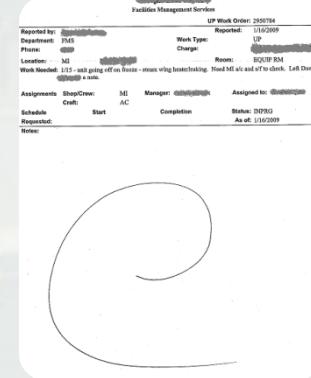
obsolete



NEVER FORGET



unspecified rqmts



duplicate systems



so what!



- duplicative data collection cost
- duplicative IT system cost
- higher energy cost
- excessive facility inventory cost
- misaligned facility inventory cost
- poor flexibility/resilience



approach



- engage C-level management
- catalog requirements
- translate stovepipes
- identify systems of record
- create standards-based exchanges
- implement exchanges



- engage C-level management
- catalog requirements
- translate stovepipes
- identify systems of record
- create standards-based exchanges
- implement exchanges

User Driven - IT System Portfolio Management



my team's contribution



- engage C-level management
- catalog requirements
- translate stovepipes
- identify systems of record
- create standards-based exchanges
- implement exchanges

User Driven - IT System Portfolio Management



requirements





Maintenance

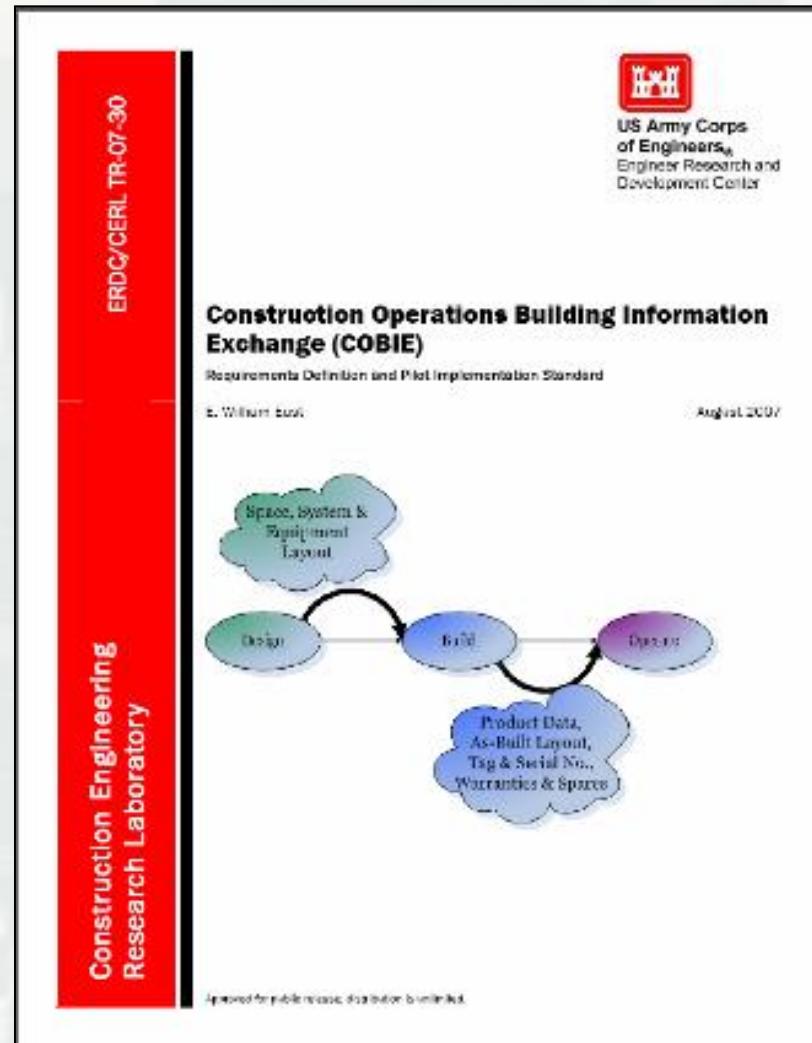
- warranties
- spare/replacement parts
- pm tasks
- resources

Operations

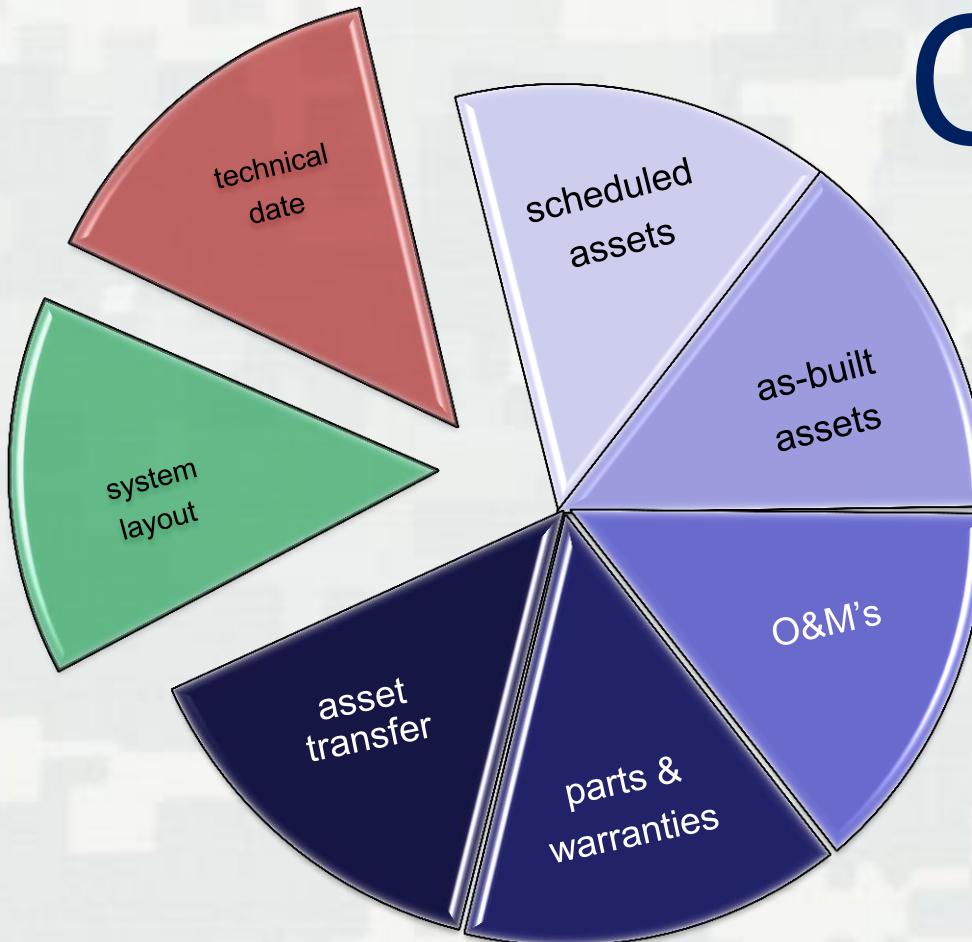
- start-up/shut-down procedure
- trouble-shooting procedures

Assets

- space measurement
- fixed or movable property
- space-function capabilities
- occupancy/zoning



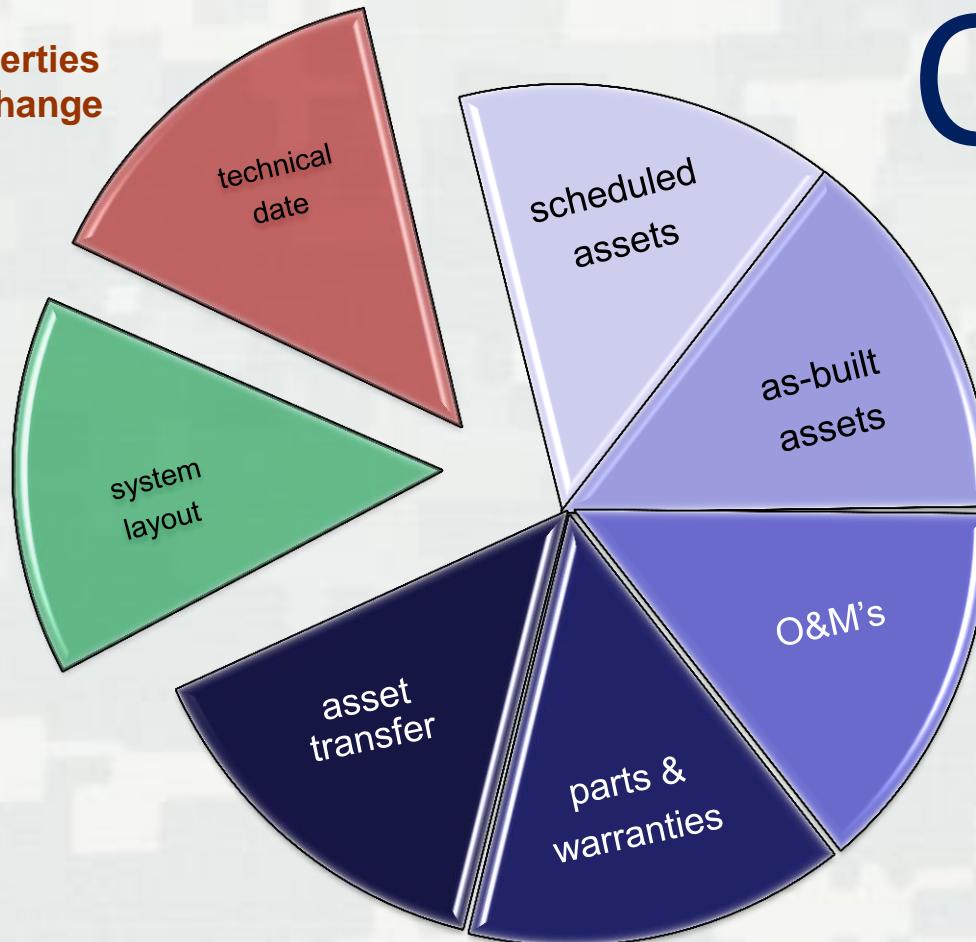
COBie



COBie

Specifiers' Properties
information exchange
(SPie)

HVACie
Sparkie
Wsie
BAMie



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standards



COBie is...
a specification for
asset inventory
and O&M info



COBie defines...

allowed formats

(IFC, ifcXML, SpreadsheetML, COBieLite)

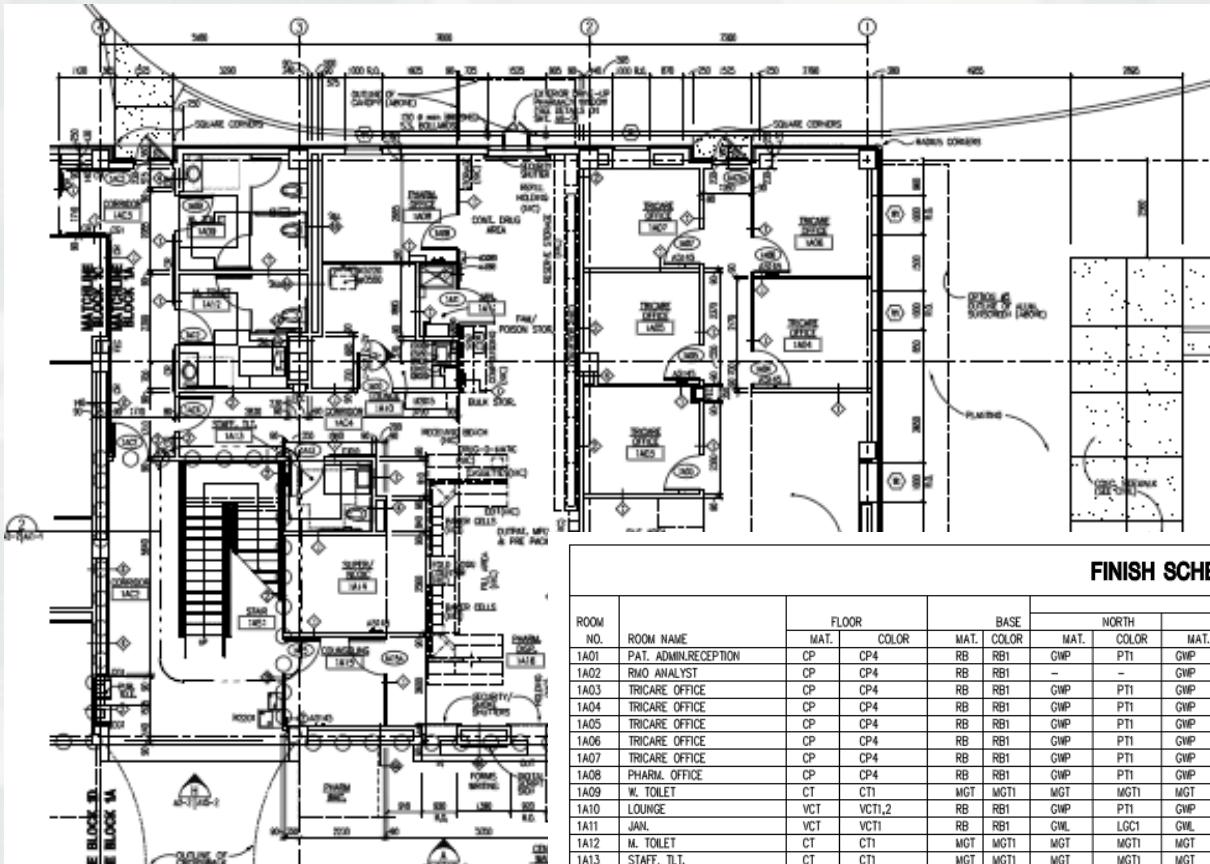
and

minimum content



example

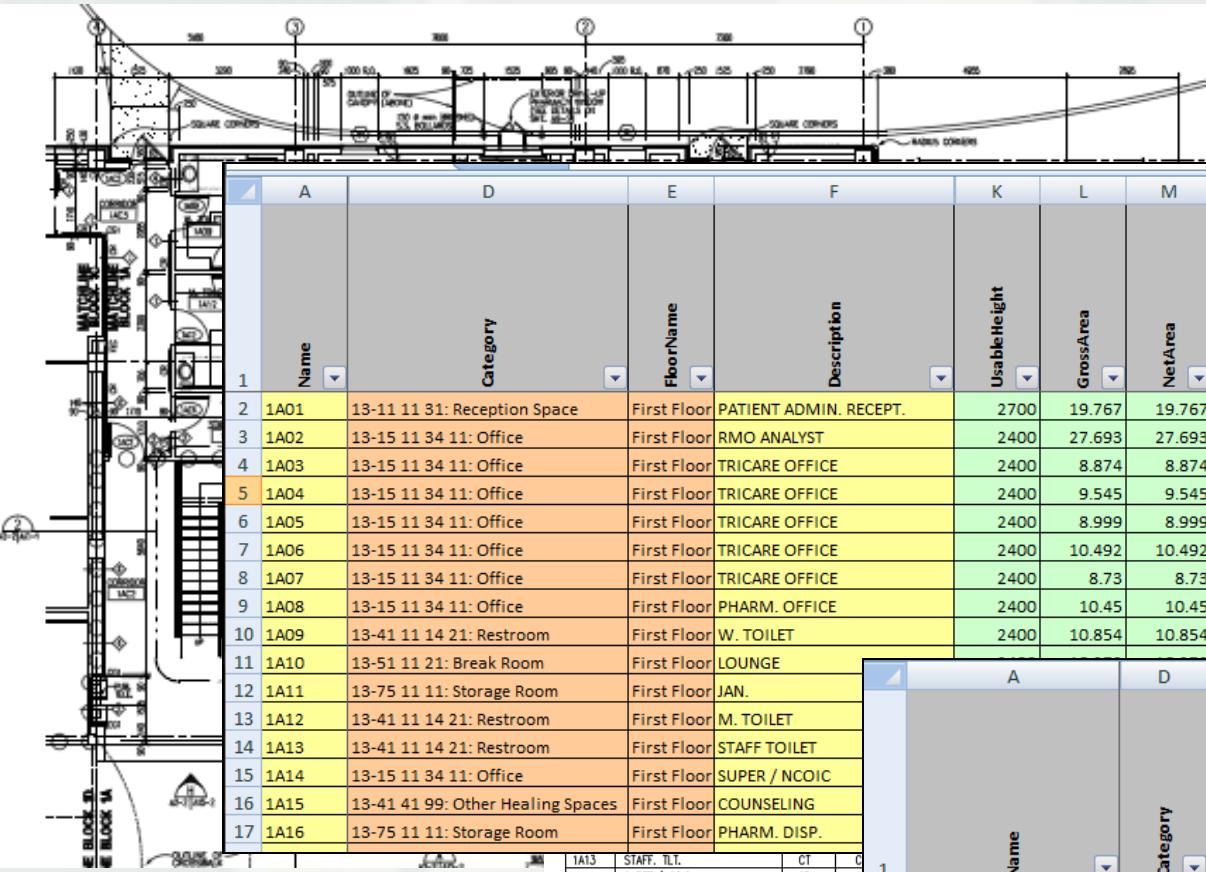




FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR		BASE		WALLS						CEILING			REMARKS		
		MAT.	COLOR	MAT.	COLOR	MAT.	COLOR	MAT.	COLOR	MAT.	COLOR	MAT.	COLOR	MAT.	COLOR	HEIGHT	
1A01	PAT. ADMIN/RECEPTION	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	—	—	GWP	PT1	ACT	ACT1	2700	
1A02	RMO ANALYST	CP	CP4	RB	RB1	—	—	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A03	TRICARE OFFICE	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A04	TRICARE OFFICE	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A05	TRICARE OFFICE	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A06	TRICARE OFFICE	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A07	TRICARE OFFICE	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A08	PHARMA. OFFICE	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A09	WC. TOILET	CT	CT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	ACT	ACT2	2400	
1A10	LOUNGE	VCT	VCT1,2	RB	RB1	GWP	PT1	GWP	PT2	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A11	JAN.	VCT	VCT1	RB	RB1	GWP	LGC1	GWL	LGC1	GWL	LGC1	GWL	LGC1	GWL	LGC1	2400	
1A12	M. TOILET	CT	CT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	ACT	ACT2	2400	
1A13	STAFF. TLT.	CT	CT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	ACT	ACT2	2400	
1A14	SUPER/HCOIC	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	—	—	GWP	PT1	ACT	ACT1	2400	
1A15	COUNSELLING	CP	CP4	RB	RB1	GWP	PT1	GWP	PT2	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A16	PHARMA. DISP.	VCT	VCT1	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A17	CENTRAL. WAITING	VCT/CP	CP3/VCT1,2	WD	ST1	GWP/MD	PT1/ST1	GWP/MD	PT1/ST1	GWP/MD	PT1/ST1	GWP/MD	PT1/ST1	GWP/MD	PT1	VAR	1,2,4,7,9,8
1A22	CORRIDOR	VCT	VCT1,2	WD	ST1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT/GWP	ACT1/PT1	VAR	1,2,4,7,9,8
1A23	CORRIDOR	VCT	VCT1,2	RB	RB1	GWP	PT2	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A24	CORRIDOR	VCT	CT1	RB	RB1	GWP	PT1	GWP	PT1	—	—	GWP	PT1	ACT	ACT1	2400	
1A25	CORRIDOR	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1A51	STAIR	VCT	VCT1	WD	ST1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	VAR	2,4,9,8
1B01	RECEPT.	CP	CP3	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT2	ACT	ACT1	VAR	4
1B02	SPECIMAN TOILET	CT	CT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	ACT	ACT2	2400	
1B03	BLOOD DRAW	VCT	VCT1	RB	RB1	GWP	PT2	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1B04	LAB	VCT	VCT1	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT2	2700	
1B05	PAT./STAFF. TLT.	CT	CT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	ACT	ACT2	2400	
1B06	LAB OFF.	CP	CP4	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1B07	DRESS	VCT	VCT1	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1B08	CENTRAL. STORAGE	VCT	VCT1	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1B09	DRESS	VCT	VCT1	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1B10	STAFF. LOUNGE	VCT	VCT1,2	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT2	GWP	PT1	ACT	ACT1	2400	
1B11	STAFF. TLT.	CT	CT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	MGT	MGT1	ACT	ACT2	2400	
1B12	CJN. SUPPLY&EQUIP.	VCT	VCT1	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1B13	RECEPT.	VCT	VCT1	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT2	ACT	ACT1	2400	
1B14	SOIL. UT.	VCT	VCT1	RB	RB1	GWL	LGC1	GWL	LGC1	GWL	LGC1	GWL	LGC1	ACT	ACT1	2400	
1B15	FILM. MEMING	VCT	VCT1	RB	RB1	GWP	PT1	GWP	PT1	GWP	PT1	GWP	PT1	ACT	ACT1	2400	
1B16	FAAC. CL.	VCT	VCT1	RD	RD1	GWP	LGC1	GWP	LGC1	GWP	LGC1	GWP	LGC1	ACT	ACT1	2400	





Spaces & Attributes

MODULE									
WALLS		SOUTH		WEST		CEILING			REMARKS
EAST	COLOR	MAT.	COLOR	MAT.	COLOR	MAT.	COLOR	HEIGHT	
PTI	-	-	-	CMP	PTI	ACT	ACT	2700	
A	D	E	F	G	H				
Name	Category	SheetName	RowName	Value	Unit				
1A13	STAFF TLT.	CT	G						
1A14	SUPER/NCOIC	CP	G						
1A15	COUNSELLING	CP	G						
1A16	PHARM. DISP.	VCT	V						
1AC1	CENTRAL WAITING	VCT/CP	G						
1AC2	CORRIDOR	VCT	V						
1AC3	CORRIDOR	VCT	V						
1AC4	CORRIDOR	VCT	V						
1AC5	CORRIDOR	CP	G						
1AS1	STAIR	VCT	V						
1B01	RECEPT.	CP	G						
1B02	SPECIMAN TOILET	CT	G						
1B03	BLOOD DRAW	VCT	V						
1B04	LAB	VCT	V						
1B05	PAT./STAFF TLT.	CT	G						
1B06	LAB OFF.	CP	G						
1B07	DRESS	VCT	V						
1B08	CENTRAL STORAGE	VCT	V						
1B09	DRESS	VCT	V						
1B10	STAFF LOUNGE	VCT	V						
1B11	STAFF TLT.	CT	G						
1B12	CLN SUPPLY&EQUIP.	VCT	V						
1B13	RECEPT.	VCT	V						
1B14	SOIL. UTL.	VCT	V						
1B15	FILM VIEWING	VCT	V						
58	BaseColor	Requirement	Space	1A05	ROPPE - 40 FAWN - 4" HIGH RUBBER COVE	n/a			
59	BaseMaterial	Requirement	Space	1A05	RUBBER BASE	n/a			
60	CeilingColor	Requirement	Space	1A05	ARMSTRONG CEILING TILE - CIRRUS TEGULA	n/a			
61	CeilingMaterial	Requirement	Space	1A05	ACOUSTICAL CEILING TILE	n/a			
62	FloorColor	Requirement	Space	1A05	INTERFACE - CARIBBEAN #3080 ANTIQUA	n/a			
63	FloorMaterial	Requirement	Space	1A05	CARPET	n/a			
64	WallColor-East	Requirement	Space	1A05	DEVOE # 2W18-2 PRARIE BUFF	n/a			
65	WallColor-North	Requirement	Space	1A05	DEVOE # 2W18-2 PRARIE BUFF	n/a			
66	WallColor-South	Requirement	Space	1A05	DEVOE # 2W18-2 PRARIE BUFF	n/a			
67	WallColor-West	Requirement	Space	1A05	DEVOE # 2W18-2 PRARIE BUFF	n/a			
68	WallMaterial-East	Requirement	Space	1A05	GYPSUM WALLBOARD WITH PAINT	n/a			
69	WallMaterial-North	Requirement	Space	1A05	GYPSUM WALLBOARD WITH PAINT	n/a			
70	WallMaterial-South	Requirement	Space	1A05	GYPSUM WALLBOARD WITH PAINT	n/a			
71	WallMaterial-West	Requirement	Space	1A05	GYPSUM WALLBOARD WITH PAINT	n/a			



FAN SCHEDULE

UNIT NO.	LOCATION	TOTAL AIR L/s	INTERLOCK WITH	TYPE FAN	MAX RPM	EXT. S.P. Pa	DESIGN MOTOR WATTS	SERIES #	POWER			MAX. SOUND POWER LEVEL dB 500 CYC IN THE BAND	DRIVE	REMARKS
									VOLT	PH	CYC			
RAF-1	20-05	9130	AHU-1	1	1250	620	15000	-	480	3	60	84	BELT	SEE NOTE THIS SHEET
RAF-2	20-05	6290	AHU-2	1	920	520	11000	-	480	3	60	82	BELT	SEE NOTE THIS SHEET
EF1-1	RF, BLOCK 1B	715	AHU-1	2	880	225	370	-	120	1	60	75	BELT	
EF1-2	RF, BLOCK 2B	860	AHU-1	2	775	155	250	-	120	1	60	73	BELT	
EF1-3	RF, BLOCK 1E	1380	AHU-1	2	925	225	750	-	480	3	60	78	BELT	*
EF1-4	RF, BLOCK 1E	70	AHU-1	2	1485	125	30	-	120	1	60	56	DIRECT	RF SPEED CONTROLLER
EF2-1	20-05	860	AHU-2	3	750	215	550	-	208	3	60	75	BELT	*
EF2-2	20-05	1130	AHU-2	3	415	250	750	-	480	3	60	77	BELT	*
EF2-3	20-05	270	AHU-2	3	1650	325	370	-	120	1	60	78	BELT	
EF-3	IE-15	450	THERMOSTAT	4	27.5	95	125	13.1	120	1	60	-	DIRECT	
SF-4	IE-15a	55	THERMOSTAT	4	26.6	95	62	13.2	120	1	60	-	DIRECT	
EF-5	IE-17	100	THERMOSTAT	4	26.6	95	62	13.2	120	1	60	-	DIRECT	
EF-6	IE-20	100	THERMOSTAT	4	26.6	95	62	13.2	120	1	60	-	DIRECT	
EF-7	IE-21	50	THERMOSTAT	4	26.6	95	62	13.2	120	1	60	-	DIRECT	
SF-1	20-05	3100	THERMOSTAT	5	45.5	125	750	23	480	3	60	-	DIRECT	* INTERLOCK WITH SPACE SAVING DETECTOR TO SHUT DOWN FAN IN SAVING POSITION



FAN SCHEDULE														
UNIT NO.	LOCATION	TOTAL AIR L/s	INTERLOCK WITH	TYPE FAN	MAX. RPM	EXT. S.P. P_o	DESIGN MOTOR WATTS	SONES \pm	POWER			MAX. SOUND POWER LEVEL IN 3rd OCTAVE BAND	DRIVE	REMARKS
									VOLT	PH	CYC			
RAF-1	20-05	9130	AHU-1	I	1050	620	15000	-	480	3	60	84	BELT	SEE NOTE THIS SHEET
RAF-2	20-05	8290	AHUL-2	I	940	520	11000	-	480	1	60	82	BELT	SEE NOTE THIS SHEET
EF1-1	RF. BLOCK 1B	7												
EF1-2	RF. BLOCK 2B	8												
EF1-3	RF. BLOCK 1E	1												
EF1-4	RF. BLOCK 1E	1												
EF2-1	20-05	8												
EF2-2	20-05	1												
EF2-3	20-05	2												
EF-3	IE-15	4												
EF-4	IE-15a													
EF-5	IE-17	1												
EF-6	IE-20													
EF-7	IE-21													
SF-1	20-05	3												

A	D	E	F
Name	Type	Space	Description
1524	Fan- EF1-1	Fan- Roof Mounted Type 1	2R02
1525	Fan- EF1-2	Fan- Roof Mounted Type 2	3R01
1526	Fan- EF1-3	Fan- Roof Mounted Type 3	2R02
1527	Fan- EF1-4	Fan- Roof Mounted Type 4	2R02
1528	Fan- EF2-1	Fan- In Line Type 1	2D05
1529	Fan- EF2-2	Fan- In Line Type 2	2D05
1530	Fan- EF2-3	Fan- In Line Type 3	2D05
1531	Fan EF-3	Fan- Sidewall Type 2	1E15
1532	Fan EF-5	Fan- Sidewall Type 3	1E17
1533	Fan EF-6	Fan- Sidewall Type 3	1E20
1534	Fan EF-7	Fan- Sidewall Type 3	1E21
1535	Fan SF-1	Fan- Sidewall Type 1	2D05
1536	Fan SF-4	Fan- Sidewall Type 3	1E15A

A	D	E	F	G	H	
Name	Category	SheetName	RowName	Value	Unit	
6772	Design Motor	Requirement	Component	Fan- EF1-1	370	Watts
6773	Drive	Requirement	Component	Fan- EF1-1	n/a	
6774	Ext. S.P.	Requirement	Component	Fan- EF1-1	225	Pa
6775	Frequency	Requirement	Component	Fan- EF1-1	60	Hertz
6776	Interlock With	Requirement	Component	Fan- EF1-1	AHU-1	n/a
6777	Max Speed	Requirement	Component	Fan- EF1-1	880	RPM
6778	Max. Sound Power Level	Requirement	Component	Fan- EF1-1	75	db
6779	Phase	Requirement	Component	Fan- EF1-1	1	n/a
6780	Remarks	Requirement	Component	Fan- EF1-1	n/a	n/a
6781	SONES	Requirement	Component	Fan- EF1-1	n/a	n/a
6782	Total Air	Requirement	Component	Fan- EF1-1	715	L/s
6783	Voltage	Requirement	Component	Fan- EF1-1	120	Volts

Equipment & Attributes



```

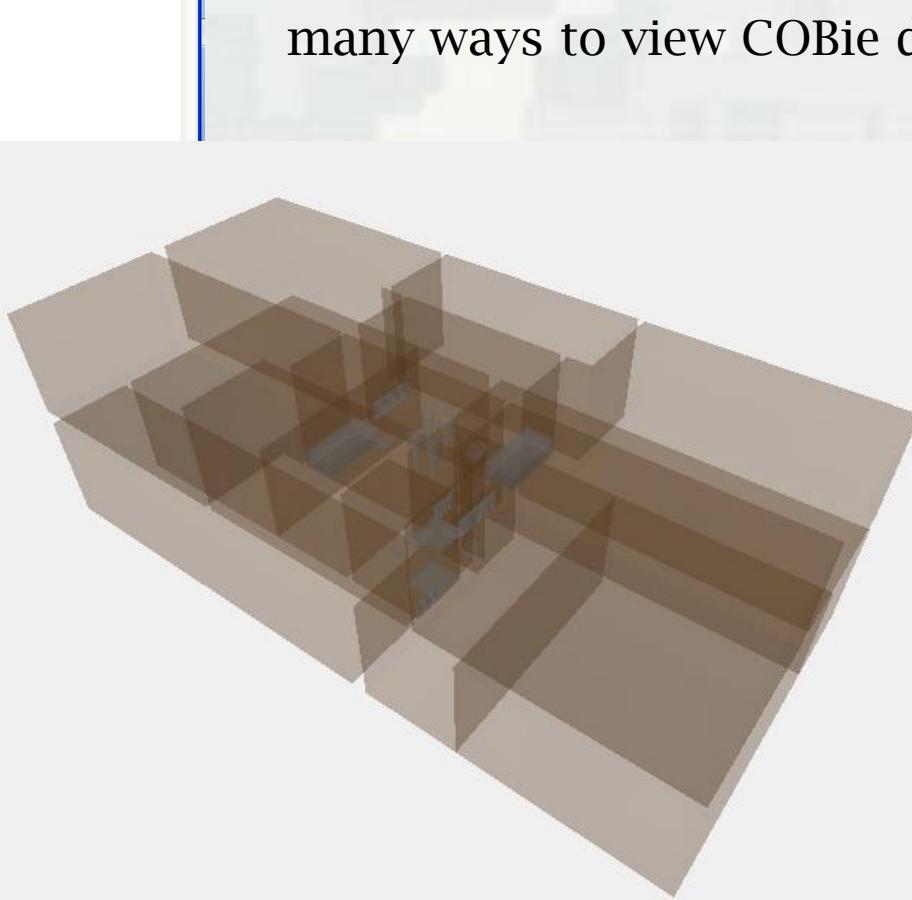
DDS.ifc - WordPad
File Edit View Insert Format Help

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#56=IFCLOCALPLACEMENT(#47,#71);
#57=IFCRELAGgregates('3KQGE05CvBxbKj5J12eKX',#42,$,$,#51,(#72,#73,#74,#75,#76,#77,#78,#79));
#58=IFCRELDEFINESBYPROPERTIES('39_CywK993LeGcxMRmYNFt',#2,$,$,(#51),#80);
#59=IFCLOCALPLACEMENT(#47,#91);
#60=IFCRELCONTAINEDINSPATIALSTRUCTURE('3DnO12yvrFBsw_XG421Xfs',#42,$,$,(#82),#51);
#61=IFCRELAGgregates('3ITf0dbsbAgMcqIBaiFaE',#42,$,$,#52,(#63,#64,#65,#66,#67,#68,#89),#90);
#62=IFCRELDEFINESBYPROPERTIES('2Wqlq1qnfHARb18VVa357',#2,$,$,(#52),#91);
#63=IFCLOCALPLACEMENT(#47,#92);
#64=IFCRELCONTAINEDINSPATIALSTRUCTURE('3c1QahbL9DggbjECzsXdd',#42,$,$,(#93),#52);
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#66=IFCLOCALPLACEMENT(#47,#95);
#67=IFCCARTESIANPOINT((0.,0.,0.));
#68=IFCDIRECTION((0.,0.,1.));
#69=IFCDIRECTION((1.,0.,0.));
#70=IFCELEMENTQUANTITY('3hP_JWOrjFcAcoApRubRh$',#2,'Storey quantities',$,,$,(#96,#97));
#71=IFCAxis2Placement3D(#98,#99,#100);
#72=IFCSPFACE('10cGsxVsJQFyUbfPRTfioI',#42,'EG-101','Living Room',$,#104,#105,'Living Room',.EL);
#73=IFCSPFACE('02x9qEpXAJmxqgRif0W',#42,'EG-102','Kitchen-Diner',$,#108,#109,'Kitchen-Diner',.EL);
#74=IFCSPFACE('2q17S0izj9x97TYrCm0vq',#42,'EG-103','Shower',$,#112,#113,'Shower',.ELEMENT.,.INT);
#75=IFCSPFACE('1DRNfca4j6CSpJ5H41CU',#42,'EG-104','Entrance',$,#117,#118,'Entrance',.ELEMENT.,.INT);
#76=IFCSPFACE('2ufu2aCPHSMS14gbIA5AdU',#42,'EG-201','Living Room',$,#121,#122,'Living Room',.EL);
#77=IFCSPFACE('30Lu9rWm2B2hgbkRIOoXAO',#42,'EG-202','Kitchen-Diner',$,#124,#125,'Kitchen-Diner',.EL);
#78=IFCSPFACE('0yVnCnCjgjAwtq7nsbRQSh',#42,'EG-203','Shower',$,#127,#128,'Shower',.ELEMENT.,.INT);
#79=IFCSPFACE('2bc7LNA1jAwtq7nsbRQSh',#42,'EG-204','Entrance',$,#131,#132,'Entrance',.ELEMENT.,.INT);
#80=IFCELEMENTQUANTITY('2cICd9L9b6CFCG0QsXnbG',#2,'Storey quantities',$,,$,(#133,#134));
#81=IFCAxis2Placement3D(#135,#136,#137);
#82=IFCBUILDINGELEMENTPROXY('2KgRevTT03AYY3uXxyK6',#42,'wbNDHWeimar-eg',$,,$, #139,$,$);
#83=IFCSPFACE('3i25nyc1AOzKeh_QETnb',#42,'OG1-208','Hallway',.ELEMENT.,.INT);
#84=IFCSPFACE('324NzePKD8aQm1n$oTVF',#42,'OG1-106','Bedroom1',$,#145,#146,'Bedroom1',.ELEMENT.,.INT);
#85=IFCSPFACE('3o0eWxg0X32xkAC7z0YSPG',#42,'OG1-105','Bedroom1',$,#148,#149,'Bedroom2',.ELEMENT.,.INT);
#86=IFCSPFACE('3a_K1M2mfbear1DIOVcU',#42,'OG1-107','Bathroom',$,#152,#153,'Bathroom',.ELEMENT.,.INT);
#87=IFCSPFACE('3L6fACDAPCJAUFPVfy1UUD',#42,'OG1-108','Hallway',.ELEMENT.,.INT);
#88=IFCSPFACE('1oBrLPTTb9YR_kHISZxvOV',#42,'OG1-205','Bedroom1',$,#159,#160,'Bedroom1',.ELEMENT.,.INT);
#89=IFCSPFACE('0P2Xbgf5f7UJKGwjpEMR',#42,'OG1-206','Bedroom2',$,#162,#163,'Bedroom2',.ELEMENT.,.INT);
#90=IFCSPFACE('1u1lW17kLfWbSI33AMW4x',#42,'OG1-207','Bathroom',$,#165,#166,'Bathroom',.ELEMENT.,.INT);
#91=IFCELEMENTQUANTITY('04UEi2VN94x8jiprlCjmK',#2,'Storey quantities',$,,$,(#168,#169));
#92=IFCAxis2Placement3D(#170,#171,#172);
#93=IFCBUILDINGELEMENTPROXY('0mRA4mCbc8OoqF1phtcP4',#42,'wbNDHWeimar-og',$,,$, #174,$,$);
#94=IFCELEMENTQUANTITY('1m0HrBe54mRl0d5nUjd',#2,'Storey quantities',$,,$,(#175,#176));
#95=IFCAxis2Placement3D(#177,#178,#179);
#96=IFCQUANTITYLENGTH('Net Height',$,,$,1.25);
#97=IFCQUANTITYLENGTH('Storey Height',$,,$,1.38);
#98=IFCCARTESIANPOINT((0.,0.,-1.25));
#99=IFCDIRECTION((0.,0.,1.));
#100=IFCDIRECTION((1.,0.,0.));

```

For Help, press F1

	A	D	E	F	G	H
1	Name	Category	FloorName	Description	ExtSystem	IFC
2	F1-101	13-51 24 11: General Residential Space	Floor 1	Lounge in flat 1	TriForma	IfcS
3	F1-201	13-51 24 11: General Residential Space	Floor 1	Lounge in flat 2	TriForma	IfcS
4	F1-103	13-41 11 14 14: Shower	Floor 1	Shower	TriForma	IfcS
5	F1-203	13-41 11 14 14: Shower	Floor 1	Shower	TriForma	IfcS
6	F1-204	13-85 11 11: Corridor	Floor 1	Entrance	TriForma	IfcS
7	F1-202	13-11 19 11 11: Kitchen	Floor 1	Kitchen-Diner	TriForma	IfcS
8	F1-102	13-11 19 11 11: Kitchen	Floor 1	Kitchen-Diner	TriForma	IfcSpace
9	F1-104	13-85 11 11: Corridor	Floor 1	Entrance	TriForma	IfcSpace
10	F2-207	13-41 11 14 11: Bathroom	Floor 2	Bathroom	TriForma	IfcSpace
11	F2-107	13-41 11 14 11: Bathroom	Floor 2	Bathroom	TriForma	IfcSpace
12	F2-205	13-51 21 11: Bedroom	Floor 2	Bedroom1	TriForma	IfcSpace
13	F2-208	13-85 11 11: Corridor	Floor 2	Hallway	TriForma	IfcSpace
14	F2-206	13-51 21 11: Bedroom	Floor 2	Bedroom 2	TriForma	IfcSpace
15	F2-106	13-51 21 11: Bedroom	Floor 2	Bedroom 1	TriForma	IfcSpace
16	F2-108	13-85 11 11: Corridor	Floor 2	Hallway	TriForma	IfcSpace



many ways to view COBie data!

ERDC

COBie resources?



Achieving Sustainable Site Design through Low Impact Development Practices

Acoustic Comfort

Aesthetic Challenges

Aesthetic Opportunities

Air Barrier Systems in Buildings

Air Decontamination

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Biogas

Biomass for Electricity Generation

Biomass for Heat

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Blast Safety of the Building Envelope

The Bollard: Crash- and Attack-Resistant Models

The Bollard: Non-Crash and Non-Attack-Resistant Models

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Building Science Concepts

Changing Nature of Organizations, Work, and

[Home](#) > Construction Operations Building Information Exchange (COBie)

Construction Operations Building Information Exchange (COBie)

by E. William East, PE, PhD
 Engineer Research and Development Center, U.S. Army, Corps of Engineers
Last updated: 04-22-2013

INTRODUCTION

Today, most contracts require the handover of [paper documents](#) containing equipment lists, product data sheets, warranties, spare part lists, preventive maintenance schedules, and other information. This information is essential to support the [operations, maintenance](#), and the [management of the facilities assets](#) by the owner and/or property manager.

Gathering this information at the end of the job, today's standard practice, is expensive, since most of the information has to be recreated from information created earlier. COBie simplifies the work required to capture and record project handover data.

The COBie approach is to enter the data as it is created during design, construction, and commissioning, see Figure 1. Designers provide floor, space, and equipment layouts. Contractors provide make, model, and serial numbers of installed equipment. Much of the data provided by contractors comes directly from product manufacturers who can also participate in COBie. Please see [Project Delivery Teams](#) for more information.

Within This Page

- [Introduction](#)
- [Description](#)
- [Application](#)
- [Current Status](#)
- [Relevant Codes and Standards](#)
- [Templates and Additional Resources](#)

"Normally it takes us 3 years to get as-builds after the financial closeout of a project. Now I can get a pre-built equipment list before the building even breaks ground? Outstanding!"
 – Deputy Director, Department of Public Works

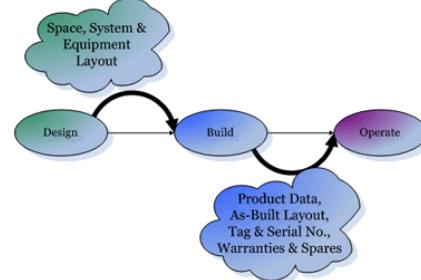


Fig. 1. COBie Process Overview



wbdg.org/resources/cobie.php



buildingSMART alliance information exchanges: Means and Methods

by E. William East, PhD, PE - Engineer Research and Development Center, U.S. Army, Corps of Engineers

How To Use This Page

This page answers the following questions:

- Can my commercial software deliver bSa information exchanges?
- What free software directly supports bSa information exchanges?
- How do alternative file formats support the associated IFC Model Views?
- Who can help me implement bSa standards?

Commercial Software

Delivering and using buildingSMART alliance information exchange standards may be accomplished with existing software used for planning, design, construction, and facility management and operations activities. The first listed below have worked directly with the buildingSMART alliance, through a public process to test and demonstrate their capabilities.

The links below provide you with the most recent assessment of each products performance. Configuration guides and user manuals are also provided, based on the software at the time of the testing. You may also compare the results of testing these tools by opening each tool in a new tab and viewing their results side-by-side in separate browser windows.

Software for Planning

Planning software can now share information using a new bSa format developed through the [Building Programming information exchange \(BPiE\) project](#). An overview of this project from the 2013 BPiE Demo may be seen [here](#). The software below has demonstrated their ability to produce BPiE information. Their most recent presentations and example files are provided here for your review.

Company	Product (click for demo)	Event (click for submitted COBie file)
DRofus	dRofus 1.5 (PPT)	2013 BPiE Demo
Onuma	Onuma System (PDF)	2013 BPiE Demo

Software for Design

WITHIN THIS PAGE

- [How To Use This Page](#)
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Latest Discussions

Revit COBie toolkit
Hi I'm currently trying to implement the revit maximo integration, but I have some doubts about Revit COBie toolkit.

Follow Joel

1) When I use ... posted 13 days ago

Bill East 3 hours ago • The definitive list is maintained at: http://www.nibs.org/?page=bsa_cobiemm

See all 7 comments ▾

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Information Exchange Formats for Building Systems
@Antony there are indeed three system-oriented information exchange formats, submitted for balloting as part of the US National BIM ... posted 15 days ago

Gregory Collins 17 hours ago • Gregory likes this.

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Invitation to complete BIM for FM survey
We are conducting research to assess the challenges and opportunities that BIM presents for the FM community. The study forms part of an ... posted 17 days ago

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Richard Williams 14 days ago • Hi Sergey, ... ▾

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About BIM information exchange
Providing information related to how government is using BIM and information sharing standards emerging from the BuildingSMART alliance

Join BIM information exchange

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bSa / Projects & Standards / Information Exchange / Common BIM Files and Tools

Common Building Information Model Files and Tools

by E. William East, PhD, PE - Engineer Research and Development Center, U.S Army, Corps of Engineers

How To Use This Page

The information on this page can assist you to:

- Download "information exchange" example files in different file formats
- See how model data from different disciplines is organized
- Compare files to see model content for different domains
- See how exchanges, such as COBie, change over time
- Use these common files to evaluate your software's import or export functions
- Use these common files to teach building information modeling
- Extend these common files for new information exchanges and research
- Find and use free tools to help you work with these files

Project 1. Duplex Apartment

The duplex apartment model was originally created by a student who developed this building as part of a design competition. This model was first used at the Dec 2009 COBie Challenge event.

COBie

- [2012-03-23-Duplex-01-Programming](#)
- [2012-03-23-Duplex-02-Design](#)
- [2012-03-23-Duplex-03-ProductSelect](#)
- [2012-03-23-Duplex-04-ProductInstall](#)
- [2012-03-23-Duplex-05-Hardcover](#)

WITHIN THIS PAGE

- [How To Use This Page](#)
- [Project 1. Duplex Apartment](#)
- [Project 2. Office Building](#)
- [Project 3. Medical Clinic](#)
- [Free Software](#)

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Assessment of Life Cycle Information Exchanges (LCie)

Understanding the Value-Added Benefit of a COBie Process

Kristine Fallon Associates, Inc.
11 E. Adams Street, Suite 1100
Chicago, IL 60603

October 2013

Prepared under CRADA-07-CERL-02 under the supervision of
E. William East, Project Manager (CEERD-CF-N)
Construction Engineering Research Laboratory
US Army Engineer Research and Development Center
2902 Newmark Drive
Champaign, IL 61822

Approved for public release; distribution is unlimited.

Information Attributes				
Current process cost:	\$ 83,957.69	Owner	\$ 15,112.84	Architect
COBie process cost:	\$ 2,156.62	\$ 479.16	\$ 46,323.27	Contractor
Process Cost Difference:	\$ 81,801.07	\$ 22,042.43	\$ 15,112.84	\$ 44,645.80

Elec. Doc				
Current process cost:	\$ 82,312.11	Owner	\$ 15,112.84	Architect
Expected process cost:	\$ 1,733.48	\$ 479.16	\$ 44,677.68	Contractor
Process Cost Difference:	\$ 80,578.63	\$ 22,042.43	\$ 15,112.84	\$ 43,423.36

COBie				
Current process cost:	\$ 82,312.11	Owner	\$ 15,112.84	Architect
Expected process cost:	\$ 1,733.48	\$ 479.16	\$ 44,677.68	Contractor
Process Cost Difference:	\$ 80,578.63	\$ 22,042.43	\$ 15,112.84	\$ 43,423.36

Process

Reference Chapter 2 Appendix for Process Map

Prepare Shop Drawings

Current Process

- 180.01 Identify Submittal Dates on Submittal Register
- 180.02.10 Receive Submittal Information from Sub-Contractors and Vendors
- 180.02.15 Log Receipt of Submittal Package from Sub-Contractors and Vendors

855	Avg. Number of Transmittals (Transmittals)
0.25	Avg. Time to Log (hours / transmittal)
\$44.19	Contractor Administrative Rate (\$ / hour)
\$9,445.19	SubTotal

Expected Process

- 180.01 Identify Submittal Dates on Submittal Register
- 180.02.10 Receive Submittal Information from Sub-Contractors and Vendors
- 180.02.15 Log Receipt of Submittal Package from Sub-Contractors and Vendors

855	Avg. Number of Transmittals (Transmittals)
0	Avg. Time to Log (hours / transmittal)
\$44.19	Contractor Administrative Rate (\$ / hour)
\$0.00	SubTotal

130 Inquiry Issue 140 Pre-Construction Plan 150 Inquiry Issue (RFI) 160 Product Type Selection 170 System Layout 180 Submittal Package 190 Submittal Issue 200 P1



<http://acwc.sdp.sirsi.net/client/search/asset/1030580>

COBie pathway



COBie on new facilities

COBie updates during operations, maintenance, and renovations



updated agency contracts (to do)

identified asset properties (to do)

integrated IT systems (to do)

updated business processes (to do)



COBie is part of NBIMS-US



http://www.nibs.org/?page=bsa_infoexchange

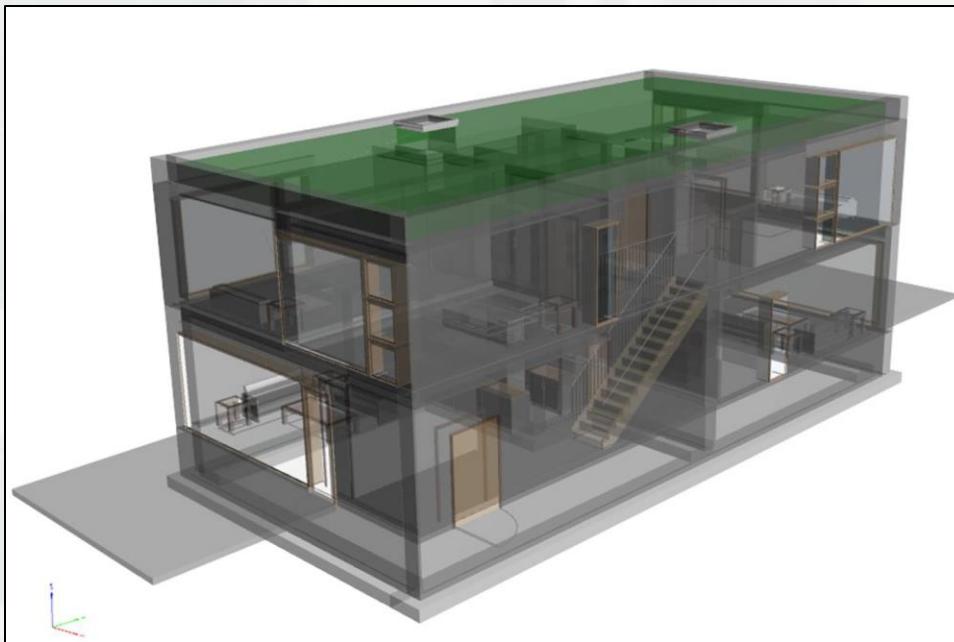


Architectural Model

Coordination Model View Definition



http://www.nibs.org/?page=bsa_commonbimfiles



Planning & Architectural Model
BPie & Coordination Model View Definition

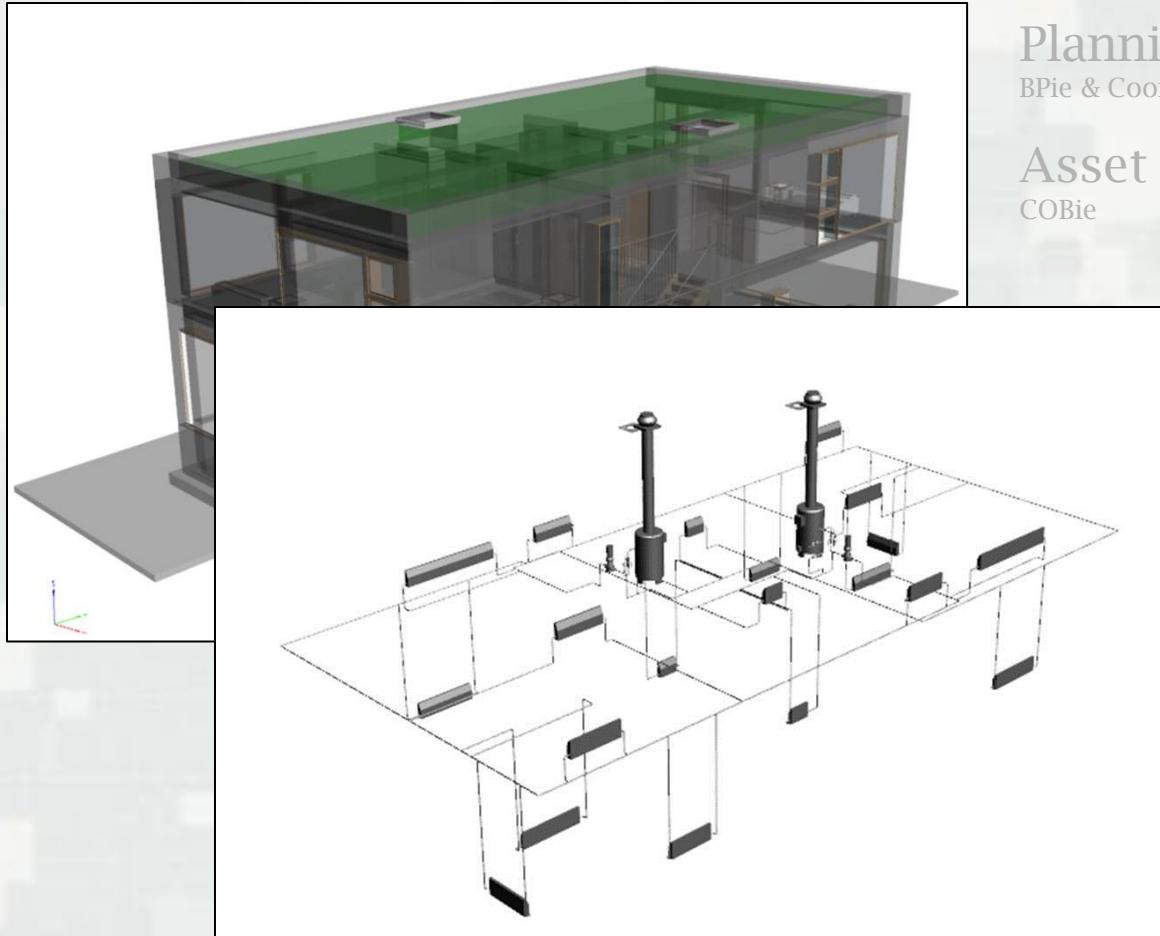
Asset Information
COBie



Planning & Architectural Model
BPie & Coordination Model View Definition

Asset Information
COBie

HVACie

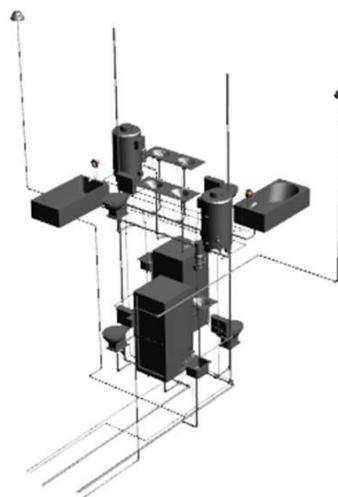
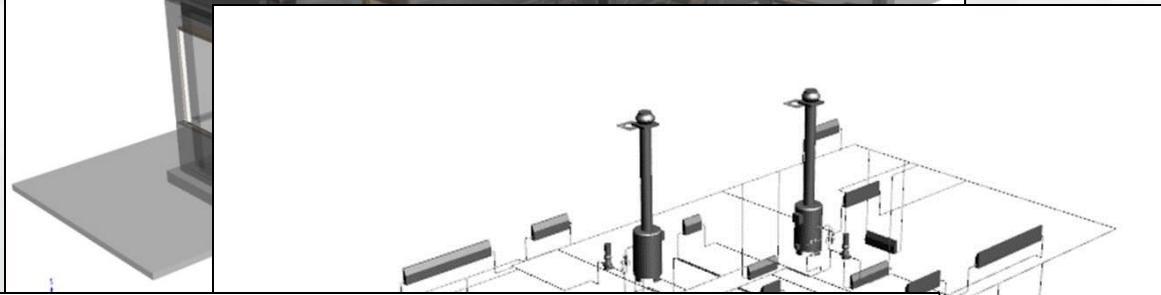
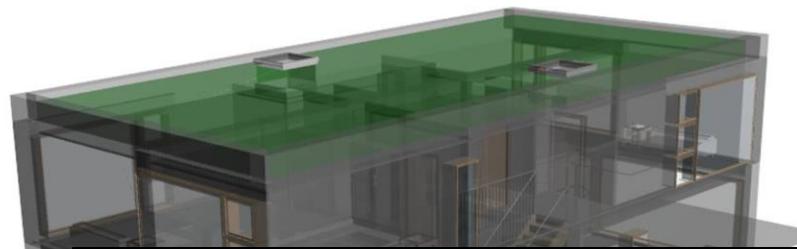


Planning & Architectural Model
BPie & Coordination Model View Definition

Asset Information
COBie

HVACie

WSie



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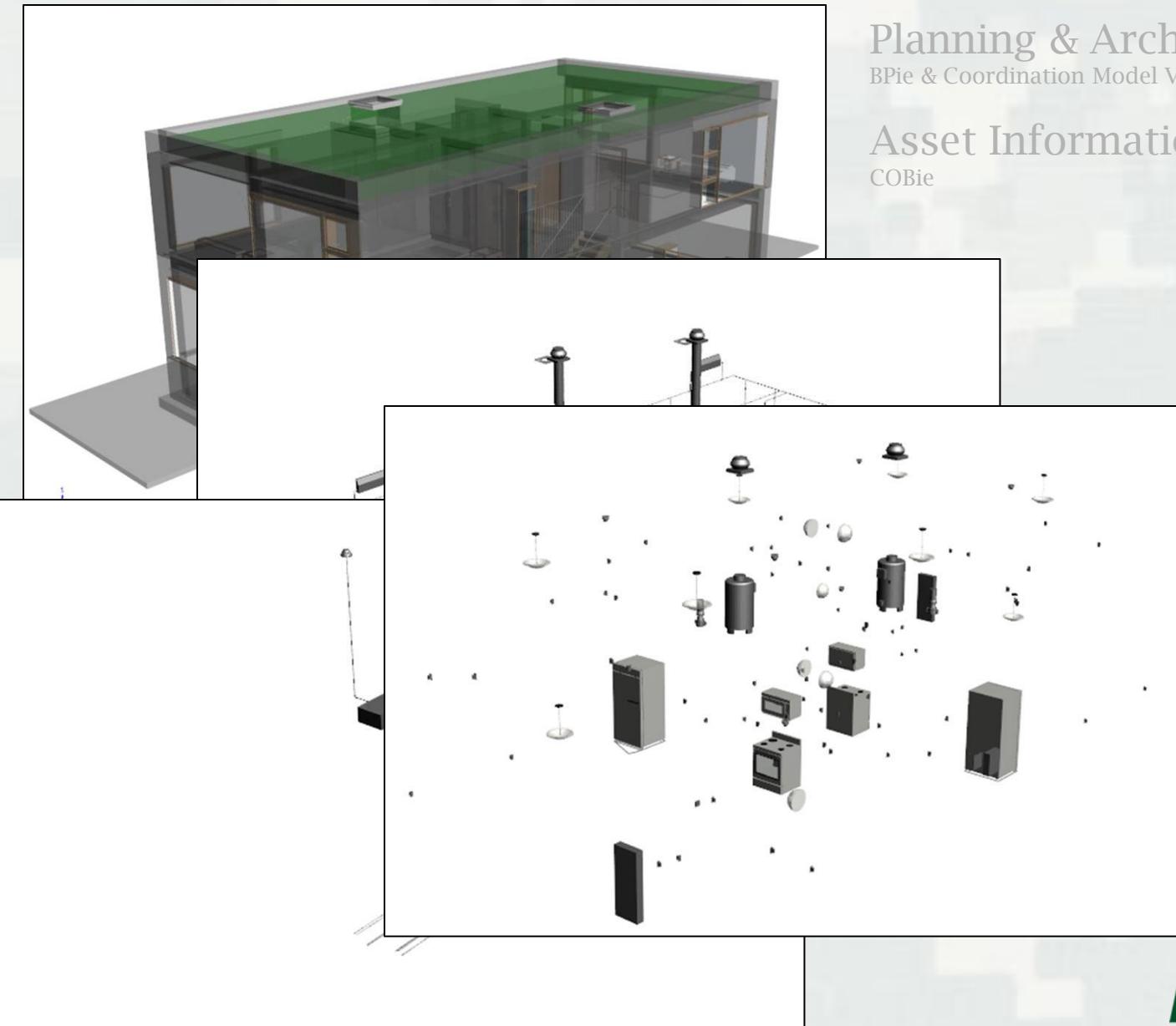
Planning & Architectural Model
BPie & Coordination Model View Definition

Asset Information
COBie

HVACie

WSie

WSie

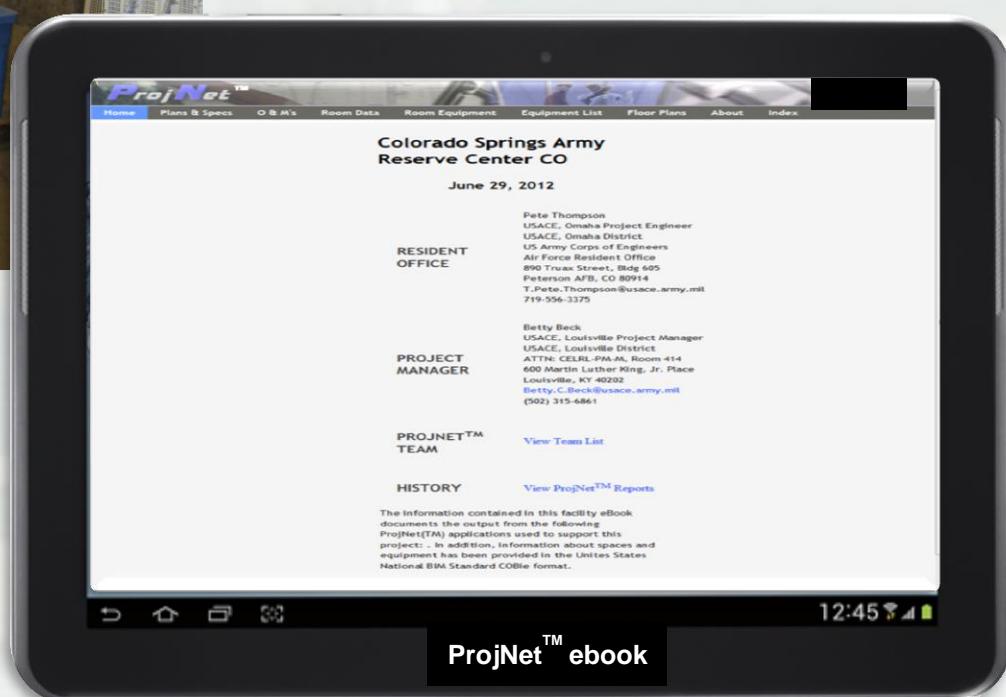


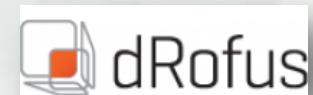
the owner's choice?





or





2007

2008

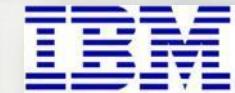
2009

2010

2011

2012

2013



VELA SYSTEMS

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Building Innovation 2014: The National Institute of Building Sciences second annual Conference & Expo, scheduled for January 6-10, 2014, in Washington, D.C., will explore *Advancing Life-Cycle Performance*. During the Conference, the Institute will look back on its 40 years of leadership and advocacy and present an informative agenda that highlights its activities and programs for developing innovative solutions for the built environment.

The Institute's councils will offer symposia that focus on different aspects of the Conference theme. During the Plenary Symposium, the Institute's programs will provide an overview of their activities and discuss how connecting across programs can help achieve whole building life-cycle performance. Popular events, including the buildingSMART alliance™ Symposium, the Building Enclosure Technology and Environment Council (BETEC) Symposium, and FEDCon® – *The Annual Market Outlook on Federal Construction*, as well as innovative technology demonstrations, such as the Construction Operations Building information exchange (COBie) and related projects, will be part of this event. In addition, Institute councils and committees will hold annual meetings to reveal their project activities to the entire industry.

Witness the Institute's impact on the industry, interact with industry experts and innovators, gain a wealth of information through educational programs, earn continuing education units (CEUs), share their expertise and experiences, and participate in solutions toward *Advancing Life-Cycle Performance*.

Building Innovation 2014 is a gathering place for building community leaders to convene for five impactful days of information sharing, networking and a content-rich conference and educational program, offering sponsors and exhibitors a great opportunity to support the Institute's efforts, reach their target audience, showcase their products and services, and gain valuable exposure and recognition for their contribution to the built environment.

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Obtaining and Maintaining Accurate Asset Inventories

Thank you!

bill.east@us.army.mil

wbrodt@nasa.gov



US Army Corps of Engineers®

GENERAL				REMARKS
1007/100				DUCTLESS, SUSPENDED AND A CO2
1007/100				DUCTLESS, SUSPENDED AND A CO2
1007/100				DUCTLESS, SUSPENDED AND A CO2
1007/100				DUCTLESS, SUSPENDED AND A CO2
2000	110/100			DUCTLESS, SUSPENDED AND A CO2
2000	200/100			DUCTLESS, SUSPENDED AND A CO2
				DUCTLESS, SUSPENDED, COMPUTER
CONDITIONS				
A. 2 KW ELECTRIC HEATING COIL, 600 OFF, FILTER				
B. PROCESSOR CONTROL PANEL, AND A CO2				
C. INSURING UNIT				
COND. FAV	ELEC.	WATER	REFRIG.	REMARKS
EA. NO	F/LA. EA.			
10	1	5.83	200/100	1500 BHP
7.0	1	5.83	200/100	1500 BHP
7.0	1	5.83	200/100	1500 BHP
7.0	1	5.83	200/100	1500 BHP
1	10.8	1	4.2	200/100

HOT WATER										
	SP. WT. LBS. GAL.	WATER FLOW CFS-PMH	ENT. WATER TEMP. °F	L.V.G. TEMP. °F	ELECTRICAL	APPROP. TEST DIA. 8 mm	DESIGN NUMBER OF PASSES	MAX. PRESSURE DROP W.P.	REMARKS	
B-1	405.0	214.0	21.0	66.9	82.3	125/1/160	5000	1	20.8	A

* THE VENT SIZE INDICATED IS APPROXIMATE SIZE FOR ESTIMATING PURPOSES ONLY. THE ACTUAL SIZE OF THE VENT SHALL BE AS

PUMP SCHEDULE								
MARK	SERVICE	NET FLUID FLOW IN.³/SEC.	HEAD IN. OF WATER	NET HEAD IN. OF WATER	NET MOTOR SIZE K.W.	POWER K.W.	IEC MOTOR STARTER K.W. RATING	TYPE
HNP-1	HHS & HHR	10.5	1750	21.4	3.0	3.0	3.0	4.0
HNP-2	HHS & HHR	10.5	1750	21.4	3.0	4.00	3.00	4.0
CNP-1	CHS & CBR	43.64	1750	21.0	5.0	4.00	3.00	7.5
CNP-2	CHS & CBR	44.76	1750	21.0	5.0	4.00	3.00	7.5

FIG. 1. THE WANTED CRITICAL CONSTITUTIVE VOLUME

- PROVIDE MAGNETIC ACROSS THE LINE STARTER AND TURN OVER TO THE ELECTRONIC

DUCT SOUND ATTENUATION SCHEDULE										
SYSTEM NO.	SERVICE	MINIMUM ATTENUATION REQUIRED, & NO. 10-12 WATTS								REMARKS
		FAR OCEAN BAND CENTER FREQUENCY HERTZ								
		63	125	250	500	1000	2000	4000	8000	
AM1	SUPPLY	2.2	3.5	10	22.2	10.5	8.4	7.6	8.0	SEE NOTE
AM2	SUPPLY	2.2	3.5	10	22.2	10.5	8.4	7.6	8.0	SEE NOTE

NOTE:
DOUBLE WALL DUCT WITH PERFORATED LINER, 50mm THICK INSULATION WITH GLASS CLOTH JACKET BETWEEN INSULATION AND LINER.
DUCT SUPPLIER SHALL SUBMIT SOUND ATTENUATOR VALUES IN EACH DUCT MANIFOLD BRANCH, TO THE MINIMUM INDICATED VALUES
IN THE SCHEDULE.

