Affordable Housing Electrification Training Series



Dates: August 29th, September 5th, 19th, & 26th

Time: 11:30am-12:30pm

- Greenhouse Gas Reduction Fund: Key Updates for Implementation in California
- Planning & Financing All-Electric New Construction
- Planning & Financing All-Electric Rehabilitations
- Understanding Electrification Technology Operations & Maintenance





Thank You to Our Sponsors and Program Partners







Comprehensive Affordable Multifamily Retrofits Program

BUILD

Building Initiative for Low-Emissions Development Program





Speakers



lan Sharples California Housing Partnership Program Manager



Peter Armstrong
Wakeland Housing
Vice President of Real Estate Development



Tony Kouot
California Housing Partnership
Senior Financial Consultant



Ari Usher Association for Energy Affordability Manager, Projects

BUILD The Building Initiative for Low-Emissions Development (BUILD) Program **BUILD**

BUILD is a residential building decarbonization program that provides incentives and technical assistance to support the adoption of advanced building design and all-electric technologies in new, low-income homes.

BUILD makes clean energy technologies accessible to affordable housing developments to benefit low-income Californians.

Incentives Overview

BUILD provides robust incentives consisting of four components:



Free Technical Assistance Services

- •Up to 300 hours of no-cost technical assistance
- •Support throughout all development phases (including building design, construction, installing near-zero emission technologies) and information on local building permits
- •Assistance with submission of BUILD Incentive Application package and participation support
- •Educational resources on all-electric building design and technologies



project.

Apply for Technical Assistance and Incentive Opportunities

Technical Assistance Application

https://aeacleanenergy.tfaforms.net/f/build-application



Program Guidelines, Incentive Application and More Information

https://www.energy.ca.gov/programs-andtopics/programs/building-initiative-low-emissionsdevelopment-program







HOUSING & DEVELOPMENT CORPORATION

BY THE NUMBERS

Wakeland's mission is to use our expertise to finance, develop and operate high-quality affordable and permanent supportive housing that meets community needs

Wakeland has developed, financed, preserved and/or rehabilitated

8,500

AFFORDABLE HOMES SINCE 1998

Overall, our efforts have led to the creation of

62

AFFORDABLE HOUSING COMMUNITIES

Wakeland has provided affordable housing and resident services for more than

43,000 PEOPLE SINCE 1998

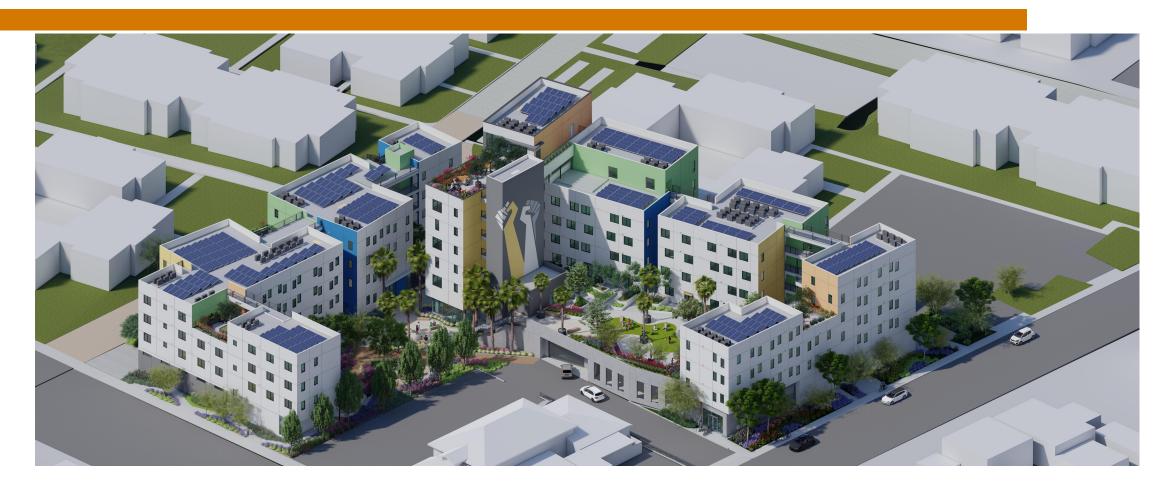
Wakeland – Electrification and Sustainability

- Early adopter of sustainable and renewable energy features.
- Organizational goal to remedy climate change, etc. in our development work.
- Wakeland has several existing LEED Silver, Gold, and Platinum projects.
- Six all electric projects completed and in operation.
- Wakeland has participated in LIWP, SOMAH, BUILD and EPIC grant and TA programs.
- Medium sized developer without specialized in house energy expertise.

Union Tower Apartments

- "Legacy" project with too many sources (11!), including BUILD.
- Total of 94 units in two buildings: one building is Type III modified construction; 1 building is Type V.
- Large family project with a set aside of 24 VHHP/VASH PSH units.
- Wakeland is developing Union Tower with a union-affiliated partner subject to a PLA.
- New buildings are replacing a portion of a former HUD-financed garden style apartment project (1960's and 1970's construction).

Union Tower Apartments



Union Tower Apartments





UNION TOWER – FINANCING AND USING BUILD FUNDS

Tony Kouot, September 5, 2024 California Housing Partnership I chpc.net

Project Schedule

- Start Construction June 2024
- Complete Construction May 2026
- 100% Occupancy September 2026
- Convert to Permanent Financing February 2027





Project Team

- Developer: Wakeland Housing and Development Corporation
- Equity Investor: Hudson Capital
- Construction & Perm Lender: JP Morgan Chase
- Soft Lenders: HCD, National City, County of San Diego, CA Energy Commission

Ownership Structure

- Union Tower One LP
 - General Partners:
 - Managing General Partner Union Tower LLC 0.006% Ownership
 - Wakeland (Developer)
 - Co-General Partner NCPA Union Tower One, LLC 0.004% Ownership
 - San Diego County Building Trades
 - Limited Partners:
 - Special Limited Partner Hudson-FM SLP LLC 0.01% Ownership
 - Fannie Mae
 - Limited Partner Hudson Union Tower LP 99.98% Ownership
 - Hudson Housing Capital

BUILD

- Grant
 - Structured as a General Partner Loan to the Limited Partnership/Project
 - Structured this way so funds are not recognized as taxable income.
- Timing of funds
 - Released during construction
 - 75% once foundations are poured (month 7).
 - Remainder at CofO.
- Grantee drafts own loan documents





QUESTIONS?



THANK YOU!

Questions?

Email info@chpc.net





All Electric Building Design Key Concepts

- For the purposes of this presentation all electric is defined as a building with no natural gas hook-ups to the building
- The transition to all-electric building from mixed fuel buildings requires support to project teams because some of the technologies are new to the industry ie heat pump water heating!
- Heat pump technology for space and water heating as opposed to electric resistance offers high efficiency
- Energy efficiency features maximized across the building first to reduce greenhouse gas emissions and keep energy costs low for residents and building owner
- Renewable generation and on-site energy storage to fill the gap



DHW Plumbing Design



DHW Equipment Selection

								- THE					1 =									
	_		_		ercease.	$\overline{}$			T PUN	AP WA		EATER SCHEDULE PROJECT	łŀ	$\overline{}$	Τ,	PHIC COM-	нестон		PLUMBI TAK VACT	IG EQUIPMENT SCHEDULE		
MARK BAR	-	SERVER	-	on	STORAGE CUPACITY (SAL)	(F) PLOS		HOSP STREET STREET SPEC	,traie		MAGE	8893	-	N FRETURE	54M. 54	ror 2	ma 19	er mest	00L0	DESCRIPTION	G_{G_1}	
written	_	coaprove narge	-	1 2	-	N 2.6	-	-	294	62	,	460 Shakara sawansa wa sa sawa sawa sawa na sawa saw	11-	BKTR DOBT	-	-	-	+	+	CAMPICA STAGRAGE STAGRASS STAG		
WCD94	ior our	00EUT-CH	UD-EL	2		B 336	4	<u>. </u>	200	82	1	DESTRUCTION OF THE PROPERTY][*	MERCONTINO	7	F	ж -		- 11	THE RESIDENCE OF THE PROPERTY	(0.60%).0	
							_	_	T,A	ANK SC	CHEOU	LE] -	ACTIVISALE AKTH GORET BUSH PURE			*	Τ,		collection in traditions comprised the collection of the collection of collection of the collection of	BREED #	
MARK NAME	KE MOREL	SERVICE	LOGATION	gn	EAPAGEN GALLISTIS	power-evenus	180°	rvitet ju	HE.	DPERATE WEIGHT !	MAG (LOS)	REMARKS	Iŀ۰	MINISTRE MIN	-	2 .	x x	٠.	+	INMER RESPONDED THE ORDER COSTS. WHERE YETH I TOTAL STEE THE RESPONDED THE SECURITY AND ADMITT AVECTORS RECEITED THE SECURITY OF THE SECURITY AND ADMITT TOTALS. DESIGNATION OF THE SECURITY	BREEN	
META SUMM	W. 6/1/6.	COMMITTEE NATES	BOOK (414)	1 2	101	4004,6161	$^{+}$	191	o	160		MATION CHARLAND THE ARTHURSEC RESTART, SP INVA, ETHARCE COMMETCARD PLEYTH BETN, ADVISED RELATION SET STORAGE SWIMMLISH & 1607	II.	3,886334	-	7	_	-	+	DILPOMANO DEI ANNO ELTELLE INVESTIGNETA ALCONOMINAT (MERMANNY) MATERIA DIVANCIA TRANSPORTERA DIVINATO MATERIA PROPERTI DI ACCONOMINATO MATE		
m*c 0.00	_	COMESTORS OUTER	1252-F4 UPS		207	10°011.00°1.	+	194	\pm	190	\rightarrow	ACMINISTRAÇÃO LIMITACOS PRIMINISTRAÇÃO POLICAS, EPULLAS, EPULADAS EMPRICADAS APERAS ACMINISTRADADAS ASTREMANISTRADAS. 1040047108 (2014)	MALIC MALIC MACIONALIA	-	-	_	+	+	DACTION FACET THYMOUS IN ANOMICS: ADMINISTRATE COMMITTEE OF COMMITTEE AND A COLOR OF A STATE OF A COLOR OF A COMMITTEE OF A COLOR O			
\$14 HLIS	$\overline{}$	SQUEEZ 40	0.551,2014	Н	161	BOARPPE	+	50	+	101	\neg	MERCIL COMMERCIA DISTRICTORINA MATRI HILLTONG WITH STEEL TONG THE TOTAL WITH STEEP AND PROMERTY OF THE		-	2 1	_	+	: 15				
ATC	ACRES .	191	NUCCE IN	1.	-		+		4		\rightarrow		ĮĽ.	P.O.D		r	_		. 19	EXCHANGE BY WINDS PRODUCED WAS EXCHANGED FOR THE RECEIVED FROM THE PROPERTY OF		
W1/ 1656 360	AC ITANG	DEMOCA	8.10 1/007	1	п	2710-3379	+	211	+	- 05	\rightarrow	SUMMERICON SPRESSED, PROVINCE SEGME RESPONSE.	1 10	(AK (NBUS)	2	r	* *		18	AMERICAN TO THE SHALL BEAUTY SANCTON TO SERVICE STATES AND SERVICE STATES AND SERVICE STATES AND SERVICE SANCTON SANCT		
1014 TON 160	M. STANG	COPYAGON	8.36 \$100F	1	9	25363354	\perp	294	4	- 01		BASSEN/CA HPRINCE), PRIACE IDENIC RETRIANT.	10			П	\top	Т	Т			
1991 ASTR	_	MORE MEDIFIC TRE	BLINGS	,		1718.3471	1	ttt	_	104	_	THE CHARGESTEE THAN CROWLEST AS EXPERIENCED THE ANALYSIS THAN EXPENSE THE POLICE OF THE PROPERTY AND ANALYSIS OF THE POLICE OF T	116	MAYON MISCOLUM	27	×	+ ,	. 1		CAMPICAN INVOCATION TO RECOMPANIES USED AND METHACS BATTON BY STOLEN AND AND AND AND AND AND AND AND AND AN		
March March	MCs NOANC	HTRD PIBLIANTS TANK	BADAGE	1		2010/01/01	\perp	100	丄	100		THE CHROLOGY BE TAKENED ALL DAME SHE WHAT BUT IN BUT IN BUT ON THE PROPERTY OF THE OWN TO SERVICE SECTIONS OF THE OWN TO SERVICE SECTIONS.	l	_	-	7 8	_		1	TO CHANGE AND THE CONTROL OF THE CON		
											CHEDU	LE) <u> "</u>	_	27	7 6	_	+	+	ATTAIN IN THE PROPERTY OF T		
MARIE BARE	RE MOREL	SERVE	LOCATEDA	an	078	TOWARD BY	il m	1 Jan	V	PH		PERMINE	ΙĽ	100 MINES	1	1	ж -		1	THE CONTROL OF THE CONTROL OT THE CONTROL OF THE CO		
MONT CRUMOS	F15 175-01404	BOMEST BETWEEN	104,0904	, ,		16 -	1	. 5740 HF		-		THAT PUMPS TO SEAL SERVED ON SHARADIS PRISE. LAMPING STERVING. 1 MENUL INTERNAL PARCY VALUE OF THE REPLANT MET OLDER OF SHE SHE ON ON THE OLDER AND MINISTERIOR.	П			Π		Т		The LC IN CONTROL PROGRAM THE INFORMATION OF THE PROPERTY OF THE PROGRAM THE INFORMATION OF THE INFORMATION		
NAS COURS	ra maker	E STATES			28	а .	+	_	-	١.		IS REPORT DEPRING CARRIES WAS EXPECTED DEPART OF THE CARRIES OF THE PERFORMANCE OF THE CARRIES CONTROL OF THE CARR	H"	e Townsell	1.		*	1.	1	THE CONFIDENCE IN THE DEMONST. SOURCE STANCES STORM, ACCORDING THE RETURN HAS A REPORT ON PROBE CONTRACTOR OF HE, STREET ACCESS ANGLE WITH ACCORDING THE STANCES AND ACCORDING ON TO GREET AND ACCORDING THE REPORT OF THE STANCES AND ACCORDING TO BUT THE STANCES DEMANDED ON		
	1753/07	100 Rt 5/70	NETALION	T		* .	4	. HP	-	Ľ	Ľ	2 (HIPMED SETTINGS). 1 (HIPMED SETTINGS).	11-	H SEVERSE	7	2	× ×	,		MERICA DIVIGIALI (DALLI BOLL FORT LI BARRIDO OT POR FINALI TORRE NOIR. SECRI DEGIGO PARETTAGOS MERITECHIO PEL MONTO LIFETUNCI.		
MINO COUNCE	F15 175-01404	BOMESTS BETWEEN BEDROOMS	BRIDGE SET FLESS		4	8 -	۱.	(740) HF	16	u	*	(2014) DETINES. § MILLI DETINE, PARTICULE EST TO DEFINATI HAT CLOSE AF RET IN THE OSCINANCE OF THE FAUR ALPROTECTION. § MILLI DETINE, PARTICULAR EST TO DEFINATI HAT CLOSE AF RET IN THE OSCINANCE OF THE FAUR ALPROTECTION.	10		P	ř	, ,	- 5		DOMESTICS OF A STREET OF A STR		
REF4 CHURCH	(81) +048A00 8444	306516 8 HETHERS	BRUMOS BUTY LUCK		10	. 10		1401	10			CONTRACT AND THE CONTRA		In-twores	ACRIC?		- x	#	- 11	NEEDING THE SO WANTE THE SUPPLIED HERE ROUGHT HOURS BOOK WITHOUT AND COURSE BOOK WITH SOME WAS SOMETHING BOOK WITH BOOK WITH BOOK WAS A SOMETHING WITH BOOK WAS A SOMETHING WITH BOOK WITH BOOK WAS A SOMETHING WITH BOOK WITH BOOK WAS A SOMETHING WAS A SOMETH	(CASC) (CASC) (CASC) (CASC) (ASS) (CASC)	
- 1			N 2011.00	1	40.60		- 1				-	A TITLE MINISTER CANDIDATE AND	₽ŀ	SONOR!	2		× .		1	PELEPHONE, BOUNDS WHICH ACCOUNTS FOR THE PELEPHONE WE BENEFIT AND COOL BUILD WITH SHELL WITH PELEPHONE STEEL PROPERTY OF THE PERSON OF THE PER	MOST IN	
28FG (FURS) 28FG (FURS) 28FG	PER 150400 1504 8005 308147348	SCOTTER IN PLAF	HUMBS	7	417	81 -	38	ID LIST	201	22	61	AND STREET WAS MISSELLAND.	1 .	M 1264 2014 1	t		-	+	+	COURT TILES DETERMINED OF MAKES BALL OF AT EXPORT THE APPLICATION OF SHELL AND COOLER BOLL HAVING BALL TELECORE. SHE CONTROL WHICH AND COURT IS AND BETWEEN A PROPERTY OF SHELL AND COOLER BOLL HAVING BALL TELECORE AND CONTROL AND CONTROL BETWEEN A PROPERTY OF THE APPLICATION OF	6	
987-6 OKUNEY 1887-6	FISH 1004 SCS 1004 SC	N BOOTS	100000	1	N N	97 - 97 -	10	10 11 F 50 17 P 50 2 F	20	72	8	SHALIS SPANLERS (TELL SOFT MISS) ILLUSTIO.	11.	ra RUMPOR SONAL	t		+	+	+	PROBLEM COME AND SOOT THE COLD, AND THE COLD AND THE COLD AND THE COLD AND THE COLD AND AND AND AND AND AND AND AND AND AN		
AP.L			_	1.1	-	H.7 .						US SCHEDULE	it.	H 10550W	+	H	ж .	+	. 16	DISTRIPTIONED THE CONTROL OF THE CON		
MANY BASI	er woors	server	LOCATION	anv	TVN	FLOW I	$\overline{}$	PART	_	VALUE		Name of the state	H	# NOTSON	+	1	_	+		AND WAS A STREET, AND WHICH STREET, ADDRESS AT COMPANIES, PARK	UNION TOWER	
BH WIT	15 (FEE)	COMPTCHO NUTSE	TOPOTECH HINESTE NE		2007 5	NL 150	ian .	*	\neg	,	,	MONIC WIN HISTORIAN, AND CONSTRUCT MODULES SHOCK	╫	MATERIAL HARAST	Г	П	Т	Т	Т	PRODUCENSE PROCES HATCH HARD HARD HARD PRINCE PRINCE ENLAGENT (THAT OF LACE). RETOLEMENTS, LISTS IN COMMISS TO SO SOLE. BLOSE DESCRIPTION D.E. BLOSE D.E. RETOLE	MINISTER WITH	
BP1 (0.0)	NE STEE	PRESTO	8,004	1,	MINIOTO PRO	ann .	\neg		\dashv	١,	_	THE PRINCIPAL ACTIONS WHICH IS DESCRIPED WITH LABORS ON ANAMORS OF WITHOUT WITHOUT AND ANALYSIS OF THE CONTROL OF T	Η"	PWEERON	1.	Ш	. .	Ι.	Ι.	\$1.00 1.0 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	RESERVE AND	
F70 0.00	-	MOPUS	1 1000	Н	PERSONAL PROPERTY AND PROPERTY	_	\dashv	-	-	H .	$\overline{}$	romeo, no empleta esta esta esta esta esta esta esta e	╢	or sportstana	+	₩	+	+	+			
MINA MINA	_	\$405 (2W	8,004	Н	008(00 008(00	_	\vdash		\rightarrow	١,	\rightarrow		115	di paranto bank di parantanan ni parantanan	۰	-	+	+	+	data bada artin Euclinia (Euclinia Banasunt systematikan diapatenta Proces Orania Provencia novan dialah serkeriki diapaten bian Basa bada artin Bullanda Guven		
	_	3507304	1000	++1		867						F SHABLE O BOTTETO AND BOTTETO AND BOTTETO AND	1 6									
BER 1870					000010	100.		T-	\neg	_	\rightarrow	P DANSE O NO RETECTOR AND RELEASED ACCOMMENTAL RESIDENT EPON CONTROL OF CONTROL MODEL, SPC. THE GRAD MAIL AL, THE AND RESIDENT PROPERTY.	łÈ		\vdash	₩	+	+	工			
201 201	_	8607104	-	Н	DOMESTO MA	_		r	-	,	-	PRINCE OF DETECTABLE AND A LARGUE COMMINIS METALS TO SUCCESSO CITIZ AND ADDITION AND ADDITIONAL ADD	ŀ	A MADE RECEIPTOR	Ļ	-	#	‡	Ŧ	јет и зати вода, колтичко, со сил ман манаст екоп зарритал ели «dif » gift ка искол кила дня в		
761 2010	MD 7/108-010	CONTRACTOR	R.DO.	1	HOHPLERIE	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C	抽	H NOT RESERVOR	-	2	1		_	Just a service sector recursor curs was design month exposured enter (\$\vec{m}\) (\$\vec{m}\) (4-4-40,00 et al on the label of conduction and the label of conduction of conduction of the label of conduction of conduction of the label of conduction of c		
	NO MIDBO	CONTRACTOR	-	1		MATOLO IO	\rightarrow	-	ine.	,	r 2	PRINCE OF DETECTABLE AND A LARGUE COMMINIS METALS TO SUCCESSO CITIZ AND ADDITION AND ADDITIONAL ADD	┇	N. 171/01100	2011.00			HOME THE	(9 (A.11)		A THE STREET AND ADDRESS OF THE STREET	
180 III	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUMBEROOM NUMBEROOM	EL PHEEL HIS PT HEATER EN	ernen ensu Konotti un	LESTON FO	HOME THE BALLMETE PLYMEN	MEDICAL DIST	ORIE EMBRUIKE. JANNO MONAZIONET SHASSHETISTOR IF ALI OBHELLISEETUR. ISAANSKOOGEAS-SHIRINGS INONNOS		
180 III	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL ESTURES TOES POSTERADORERS SELECTEMBRISHES NOL ESTERMINALISM	MANAGEMENT	17900 (40). 630000 (6) 6300 TO (6)	LESTON FO FORMAL COM IL PROVIDED I	HOME THE RALLMET IN PLYMENT IN REVINE ALL	MEDICAL STATE	COST E THEMSILE. 1294-14 MEN MENTALESPARE THEMSILE IT STOP IN PLA LOTH HE LISTE COST. 1294-14 MENTALESPARE THEMSILE IN CHARGE. 1294-14 MENTALESPARE AND HE MENTALESPARE IN COST AND THE SERVICE OF THE SERVICE. 1294-14 MENTALESPARE AND HE MENTALESPARE IN COST AND THE SERVICE. 1294-14 MENTALESPARE AND HE MENTALESPARE IN COST AND THE SERVICE. 1294-14 MENTALESPARE AN	AND STREET, ST	
781 2010	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL EVENES TO SE POVERA SOCIAL NUL ACTEMBRICA NUL A	CONTRACTOR AND	OTRANS AND LINES TO SELECTE SE	LESTON FO FOULAL COM E PROVIDED COMULI COMP LANZONIUS	HORE THE RALPET P PLYNOTHE REVINE HE CT 670 HE ST 1890 HE	MEDICAL DIST	COST ET MENTIONES. CONTRACTOR OF THE CONTRACTOR	A TOWN NOT THE PARTY OF THE PAR	
7801 2000	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL EVENES TO SE POVERA SOCIAL NUL ACTEMBRICA NUL A	CONTRACTOR AND	OTRANS AND LINE TO SEE STATE OF SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	LESTON FO FOULAL COM E PROVIDED COMULI COMP LANZONIUS	HORE THE RALPET P PLYNOTHE REVINE HE CT 670 HE ST 1890 HE	MEDICAL DIST	ONE ENHANCE. CROSS METACONE PROSENTATION IF ALL OF AN LIGHT CROS. ETA-MARK-SOCIE ALE-PRINCE SHOULD	A TOTAL OF STATE OF S	
781 2010	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL EVENES TO SE POVERA SOCIAL NUL ACTEMBRICA NUL A	CONTRACTOR AND	OTRANS AND LINE TO SEE STATE OF SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	LESTON FO FOULAL COM E PROVIDED COMULI COMP LANZONIUS	HORE THE RALPET P PLYNOTHE REVINE HE CT 670 HE ST 1890 HE	MEDICAL DIST	COST ET MENTIONES. CONTRACTOR OF THE CONTRACTOR	100 M	
7801 2010	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL EVENES TO SE POVERA SOCIAL NUL ACTEMBRICA NUL A	CONTRACTOR AND	OTRANS AND LINE TO SEE STATE OF SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	LESTON FO FOULAL COM E PROVIDED COMULI COMP LANZONIUS	HORE THE RALPET P PLYNOTHE REVINE HE CT 670 HE ST 1890 HE	MEDICAL DIST	COST ET MENTIONES. CONTRACTOR OF THE CONTRACTOR		
7801 2010	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL EVENES TO SE POVERA SOCIAL NUL ACTEMBRICA NUL A	CONTRACTOR AND	OTRANS AND LINE TO SEE STATE OF SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	LESTON FO FOULAL COM E PROVIDED COMULI COMP LANZONIUS	HORE THE RALPET P PLYNOTHE REVINE HE CT 670 HE ST 1890 HE	MEDICAL DIST	COST ET MENTIONES. CONTRACTOR OF THE CONTRACTOR	A DECEMBER OF THE PROPERTY OF	
781 2010	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL EVENES TO SE POVERA SOCIAL NUL ACTEMBRICA NUL A	CONTRACTOR AND	OTRANS AND LINE TO SEE STATE OF SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	LESTON FO FOULAL COM E PROVIDED COMULI COMP LANZONIUS	HORE THE RALPET P PLYNOTHE REVINE HE CT 670 HE ST 1890 HE	MEDICAL DIST	COST ET MENTIONES. CONTRACTOR OF THE CONTRACTOR	Marie Barriero	
160 E	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL EVENES TO SE POVERA SOCIAL NUL ACTEMBRICA NUL A	CONTRACTOR AND	OTRANS AND LINE TO SEE STATE OF SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	LESTON FO FOULAL COM E PROVIDED COMULI COMP LANZONIUS	HORE THE RALPET P PLYNOTHE REVINE HE CT 670 HE ST 1890 HE	MEDICAL DIST	COST ET MENTIONES. CONTRACTOR OF THE CONTRACTOR	100 May 100 Ma	
761 2010	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL EVENES TO SE POVERA SOCIAL NUL ACTEMBRICA NUL A	CONTRACTOR AND	OTRANS AND LINE TO SEE STATE OF SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	LESTON FO FOULAL COM E PROVIDED COMULI COMP LANZONIUS	HORE THE RALPET P PLYNOTHE REVINE HE CT 670 HE ST 1890 HE	MEDICAL DIST	COST ET MENTIONES. CONTRACTOR OF THE CONTRACTOR	CORP. NO. OF THE CORP. THE	
160 E	MD 7/108-010	CONTRACTOR	R.DO.	1	HONTLINIA	MATOLO IO	\rightarrow	NACK T	ine.	-	r 2	P ANDRE DE RETTOR NEIDE, LE POLLE COMMON RECION TORS CHARGE, CICLE ANDRE CHELLE, EN A CE SELLE, EN AN ART COMMON PROPERTIES CHEMICAL COMMON RECORD CONTRACT CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL CHEMICAL C		NUL EVENES TO SE POVERA SOCIAL NUL ACTEMBRICA NUL A	CONTRACTOR AND	OTRANS AND LINE TO SEE STATE OF SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	LESTON FO FOULAL COM E PROVIDED COMULI COMP LANZONIUS	HORE THE RALPET P PLYNOTHE REVINE HE CT 670 HE ST 1890 HE	MEDICAL DIST	COST ET MENTIONES. CONTRACTOR OF THE CONTRACTOR	Section that year part of the	

CONSIDERATIONS

- Heat pumps
- Storage tanks
- Swing tank
- DHW circulator pumps
- Mixing valve
- Balancing valve



Union Tower Equipment









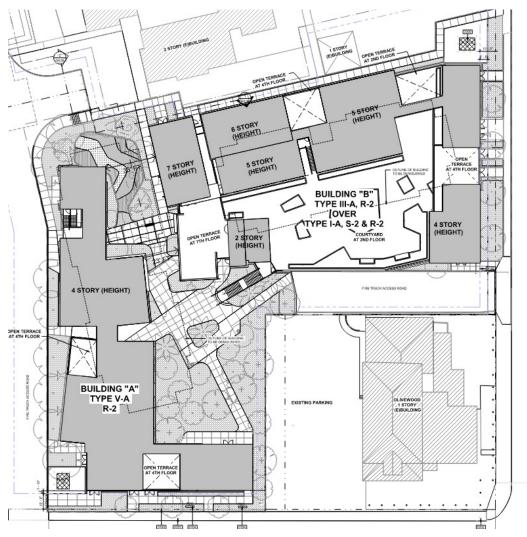








DHW Space Planning

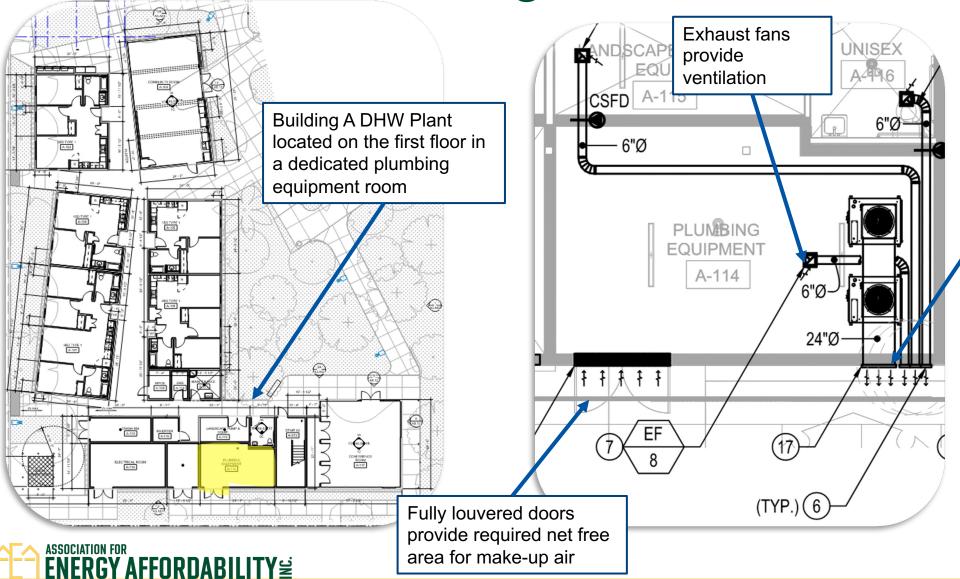




CONSIDERATIONS

- Ambient air temperature
- Ventilation needs
- Sound rating
- Structural
- Weather proofing
- Site lines

Union Tower Building A



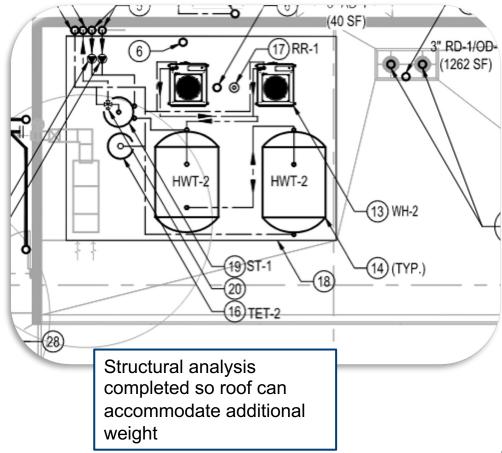
Heat pump exhaust is ducted directly to the exterior. Internal heat pump fan must be able to handle static pressure from ducting

Union Tower Building B

DHW Plant located on fifth floor roof

Exterior install location makes ventilation easier! Horizontal storage tanks to accommodate site line requirements

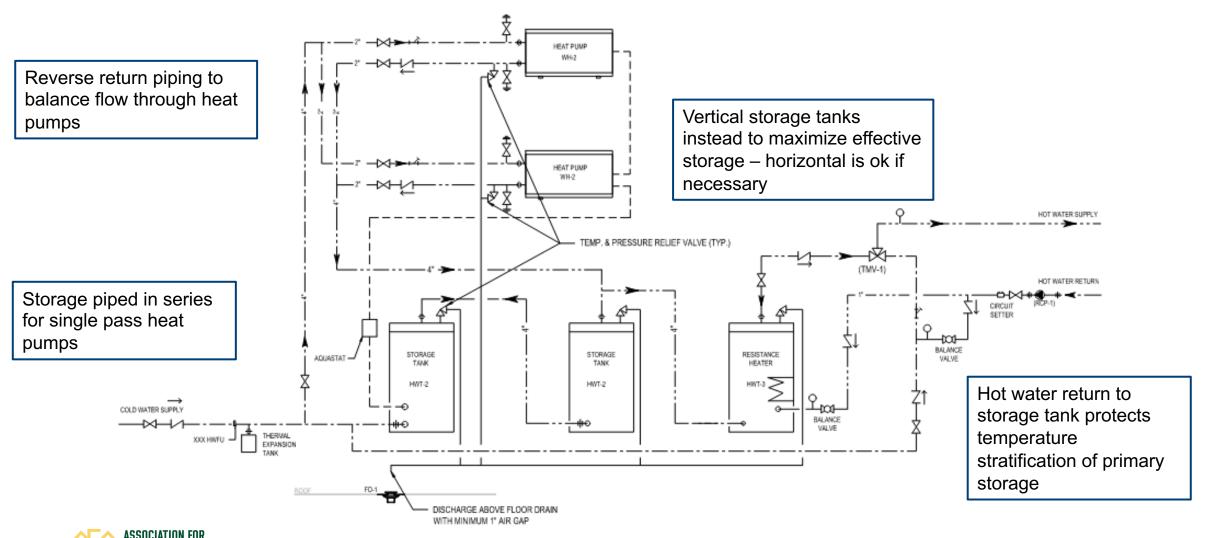
Weatherproof enclosure "dog house" likely needed





Union Tower Piping Diagram

ENERGY AFFORDABILITY



DHW Additional Best Practices

- Heat pump efficiency
 - CO2 (R-714) based DHW heaters provide high efficiency ratings
- Thermal balancing valves (TBVs)
 - Distribution is balanced through the riser based on a temperature signal rather than a specific flow rate. This can reduce circulator pump energy use
- Variable speed circulator pump(s)
 - A variable speed circulator pump will ramp up or down to provide for circulation needs in response to signals from the TBVs
- Electronic mixing valve
 - Mixing valve is balanced automatically by the equipment rather than via manual balancing



HVAC Design



Union Tower Space Conditioning

				cod	OLING CAPACITY		HEATING CAPACITY	
MARK	QTY.	MAKE	MODEL	NOMINAL BTUH	SENSIBLE BTUH	SEER/EER	втин	
FC-1	45	SAMSUNG	AC018BNHDCH/AA	18,000	13,500	19.6/12.5	20,000	
FC-2	25	SAMSUNG	AC024BNHDCH/AA	24,000	18,000	20.5/12.6	27,000	
FC-3	24	SAMSUNG	AC030BNHDCH/AA	30,000	22,500	17.7/10.3	32,000	



				NOMINAL CAPACITY					
MARK	QTY.	MAKE	MAKE MODEL C		HEATING BTUH	HSPF			
CU-1	45	SAMSUNG	AC018BXADCH/AA	18,000	20,000	10.6			
CU-2	25	SAMSUNG	AC024BXADCH/AA	24,000	27,000	11.0			
CU-3	24	SAMSUNG	AC030BXADCH/AA	30,000	32,000	11.0			

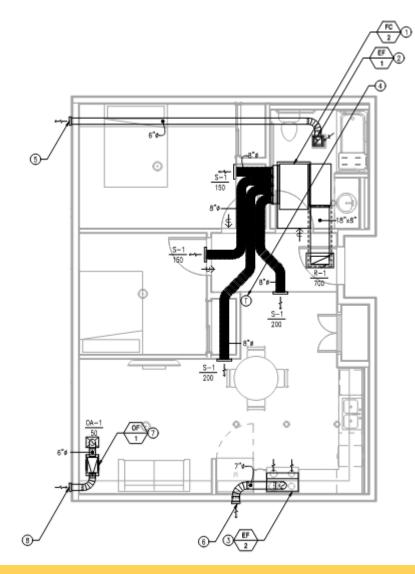
Split heat pumps with an outdoor compressor and an indoor fan coil unit

Inverter-driven compressor rather than a single-stage compressor to increase space SEER and HSPF efficiency





Union Tower Ventilation and Distribution



Ducted distribution provides conditioned supply air to every bedroom and living space with a single fan coil unit

Outside air fan + exhaust fan provides balanced ventilation for excellent indoor air quality



HVAC Other Considerations

- ERV for energy efficiency and to temper incoming fresh air
- Packaged space conditioning for smaller unit types may be more applicable for retrofit applications



Envelope Design



Energy Efficient Envelope

CONSIDERATIONS

- CA Energy Code Title 24 Part 6 provides a high standard for envelope efficiency
- Some opportunities exisit above and beyond code



Envelope Best Practices

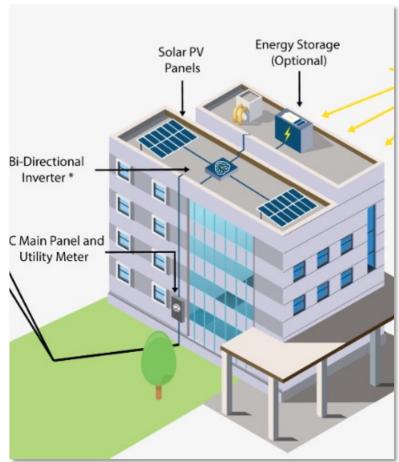
- Build to QII standards, even if not required by code or green certification programs
 - Continuous air barrier prevents infiltration and exfiltration
 - Insulation installation free from gaps, compression, and buckles prevents conductive loss
 - Filling all cavities even at headers and knee walls prevents convective loop loss
- Perform air leakage testing, even if not required by code or green certification programs
- Insulate all surfaces between conditioned and unconditioned spaces, even under podium slab
- Utilize advanced framing techniques where possible to minimize lumber and thermal bridging



Renewable Energy and Storage



Renewable Energy and Storage Planning



CONSIDERATIONS

- Future Proofing: NEM3, PV, and battery storage
- April 15, 2023: CPUC published a new solar PV interconnection tariff
- Net Billing Tariff (NBT) also knows as NEM3
- Affects customers served by electric IOUs
- Take-away: reduced export credit under NEM3 incentivizes self utilization and battery storage



Battery Ready Considerations

- Isolate critical loads
- Identify location for future battery
- Provide for required setbacks
- Provide for fireproofing and weatherproofing
- Provide conduit to solar PV (roof) and electrical room
- Provide for required ventilation
- Provide sub panel in electrical room
- Plan and isolate critical loads



Thank You!



Heating, Ventilation and Air Conditioning

SPLIT SYSTEM INDOOR UNIT SCHEDULE																					
INCH.	HAVE GTT. HAVE		MODEL.		CELMIS EAPWOITS	_	HEATING CHPAST		BLOWER W BOT, BS, SS, SVD		$\overline{}$		ELECTROAL DATA				16WGI		9894F	NIMAKI	
401	6	SASING	ADMENIOSIA	PROMERSES. BETWEEN	BENSBOLE BTO	M SCENEEN	11.00	9	Fig. 837.	EF, (FE, WC)	POWER	WOLT	PH	FLA MCE	HIGGS	- 480 MI		16.0			
FOE	13	IMBUNG	ACTORNOCIONA	24.00	100	2010	25,000		9	14	1076	200000	-	288 -	1			0.0 (MT	83	MONEC CHECKNET CHEN, OVERTON NO TILL IS CONTANT HEMICENT CERTLARIS ENAMOUSE PRIMER CHECKNET FRING ESCONCET SHITLE FIGURITIES. CONTINUED IN MONEY THEN A FECON LIST NAMES OF DISEASE OF	
758	36	9 8 596	ACIDER/FDORM	200	20/60	6349	11,110	_	8	5.8	5016	201090	_	2.81	-		- 8	X3 INT	現主	4	
PG4	1	CARRES	#MSW040X1	18,018	39,381	6362	14,000	1	or .	16	COH	0012N		50 .	L:	CONTRENCE MODEL A FET		1445	WOMEN CONCERNANT PLAPFORTH CONCERNANT CHARLOW WITH THE SEE PLANENCE PRIVATE FOR CONCERNANT PRIVAC SECONDACT SMECH BY ELECTROSIC CONTINCTOR, ROCKEY, UNIT FOR EACH STORM OF THE CONTINCTOR AND THE CONTINCTOR ADDRESS OF THE CONTINCTOR FOR PRIVATE PRICE OF THE CONTINCTOR ADDRESS OF		
104	1	OWNER	#BRHIDDOW)	57.00	420	173793	NAME		×		- 1	200031	$\overline{}$. 15	Τ.	COMMENTS ROOM A-151		MIT	PROJECTOREMETE PLANNETH HORSE, OWNERS HE TILL DE CONFLANT PROMOSTOT DE PLANNES D'ANNOSTOR PRANTY COLODISATERNAS, PROJECT ACTA HORSE DE LA PROTECTO ACTO DE LA PROMOSTOR PRANTY COLODISATE PRANTY COLODISATE PRODUCTO ACTO DE LA PROTECTO ACTO DE LA PROPERCIONA ACTO DE LA PROTECTO ACTO DE LA PROPERCIONA ACTO DE LA PROTECTOR ACTO DE LA PROPERCIONA ACTO DE LA PROTECTOR AC		
	-		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,												-			,000			
704	2	(1895)	49AMBONIAL	1500	730	215125	14,160	_	8	-	CHIF	201251	_	Lift -			2.5	ROYADS CONCERNATE PURPLYSHOUGH CONTROL IN CITES IN CONTRACT THERWOOD IT SEE PLUMENS DRAWNINGS ON PRIMARY CONCERNATE PRIME INSCRINGET SHITTER BY INSCRINGE CONTRACTOR AND DESCRIPTION OF CO			
VC1	1	CAPIER	#MARGENU	20,000	18,017	21,911.8	26,000	_	94		QUTTI-P	201211	-	III -	The second secon				418	PROVIDE COLORBATE PLAP WITH CHERK OVERATOR PRECEDENT TO CHERCHE WHITCH, LAT JEE PLAB OF DAMINGER OF CRECKING PRINC, OF TOOR JUST POWERS	
108	1.5	DAVIES	40/1903-3	11,000	10361	63103		,	61	-	OUTHE	201291	1	- 11		INCOME NOW & OF	MARKET	IC IMPRIES IS MORE SOVER I	2.0	@nccox unt cosusciosus suit.	
104	2	04063	4M5000-0	5000	428	93793	52,000		W.	16	088147	261051	-1-	- 116		DIFFICE IS	OF CHREEKY	BAGENERT 9-701, LOSSY 9-101	100	PROVIDE CONCERNATE OVERN, OVERNITOR THE PLANSACIONAMENT FOR CONCERNATE PRINCE, SECONDECT MINTOR IN ELECTRICAL CONTRACTOR, RECORDANT PROVIDED BY CONTRACTOR RECORDANT	
1000	1	berne	49/4/800073	100	4301	8.9511	689		-		00119	201201	$\overline{}$	th tri	7		91009	e editore ed a	8271	PROTEST COLCREGATE IN APPLYTH COMPRON MICH CO. COLC. AND THE ROCKY THE PLANTS COMMUNICATE PRIMARY COLCREGATE FROM DECOMET 1947 OF	
1011	1	CHERT	envectors.	1500	1088	20,9111	15,100		01	-	\$10 P	201210		827 ·	-		represe	DAMES FOR	11.0	MACTYCOL CONTROCTOR, RECEIVARY NOT PORMISSING SUITCECH BUT.	
A	•							-	-												
													SPL	IT SYST	TEM OL	JTDOOR UNIT S	CHEDU	LE			
	т				WOMHAL CHPAC	TY.	\neg	BLECT/VICES	EATE		WPRODESIA	TLASE	\top	\top		-					
BARK	ers.	HAVE.	MODEL.		$\overline{}$	$\overline{}$	-		\neg	1074	e ere ve	ENTICAL LI	VE VE	err y	MATER	INDIATORS FWI	COLUMN			PERMANEN	
1	1	l		COOLING STA	HEATING III	TUR HEFT	1 "	" '	MOI MOI	LEGO	THIPT)	90	Τ.	1		- 1			SPINON B		
504	-6	SWSB-C	ACHIED/OGHA.	11,001	2.00	91	100200		25.1 25		141	50.4	190			15,47095	R01				OFFICERED TO
611	25		ACIDIENDONA. ACIDIENDONA.	31,00	27,03	90	20620		21.1 20		84.0 84.0	50.4 50.4	181			50,/398 50,/398	FG2 FG3	4			
0.00			AMUNIOUS	9.00	10,000	- 15	20020	- 1	M5 2			- 500	291		PEG		51	V.			
614	17	ORKER	SMISPEQUANT	\$7,000	0.00	9.4	200200	1	iia k	7	rior .	800	770	6	SPRINGS	10,x10/0	806	PROVEST HIRSTON SPING BELLEVIK, ME	- HERONA	POST LODING DIP INSCRINET INST DIRVILIECT NOS. CONTINCTON.	C MARKET NO.
43.6	1		88010910	1,33	937	60	2620		10 2		F1	100	1003			SUATIVE SECTION	K1	1			
697	1+	OWER	58405(4H)	200	2,30	100	106100		H 112		94.6 (60	100	1984			10,4705 10,4705	904 904	1			
-86-	1		240/03/-3				20020		IU - X		26	- 80	134				She	1		kl	
211	٦,		2600 #03/00	31,000	20,000	90	208200	TTT.	10 8	,	00.0	50	1367					HALF-COVE COMMONWELLEY PROVING VI	98/10/1 98 5	C BIS MON MICHIGATION FOR LOCKING DIR BECOMBECT (INTO INTLLICT NON, CONTINCTOR, NOVORIMAN PRACTICAG MICHIGATION CONTINCTOR CONTINUED IN M. B. PAR.	
, manage	*				re-ere-ere		-	-	-		-		rbrer		rerere		0,0,0,0		00000		UNION TOWER
															FAN	SCHEDULE					
MARK GT		ex Money.	FANTRIS TO	DALORM ESPON	o Fas	Mo	STOR DETE				- 0	erwes.				WEIGHT MICH	\neg			results)	STATE OF THE PARTY
-	+				100	NOVEM	-										Incorp	DATES ATTAL STORE WORD	WHEN	MTCMPRE PROVE NUTTIPHED AS WITH THE ARE BURET HEREOF AS HELL IN COMMEND OF HONCOVERTING THE BURE BUR COVERGUE AND HER RETTINGUE ACCOUNTS	
101 9		20100	DECIDEN	40.00	36	1918	10 1	10 1	l		PRODUM	N. MHID	200			12.6		CREPOLITES & JOCKE POLITES (MICE) REMANATOR AS SHOWN	MECH FOHICH S	MILETE MANY HE REATHER MARCETY AT BIS DERINALALY SMITCHES FURNISHED AND RELIEF STREET, INC. MICH. SCHWACT DE TO COMMICTION HEST CLET HICKORY. TO	PROJECT NO. 469-31-000
B10 8		20 2 E 200	Districts 1	Hara Sala	4-7-4-2	70.	$\sim \wedge$	9-11						-			10000	terforing at which should be \$140.		Monte Control on the Words of Acting to Control on the	
B/3 4		NOX SPACE	DARCTORNE DARCTORNE	10 125 10 125		D5 1	1	29 I			109 / E/08					40	58.04	I, BE ENERGY STAN COMPLIANT, PROVIDE INT	1-BACKDWT1	CMPER, NTSH, COX HITH LIGHTBATCH.	
B/4 1		WGXUSERA		ML		218	Sh 2	5 1-			DEA CHIEF						75				
E1 1		983 IF408V	S SARCTERUS		1791	10'97	- 7	10 I			8.00 B 1	75508 501 9	106.			31 4	3	BIT SWITCH BY BUSCIPHICK, CONTRACTOR, FO	NA TORINODA	76.0.001	
82. 1	see	MOXONE	THE TONE	26.	-13	317		2-1-1-		ALMK WIT					ME INC	1	_				
84 8	SMI	910X 270K	DRICTORIS	0 120	90	77 1	N 7	9 1	SPRING		E+109.51084 DG-R-MPICS				24640	,	5500W	ECT ENTON ET ELECTRON, CONTRACTOR &	THE COLDER	LIBHTRETOR FARTORIA CONTRACUILT IN FLORENCES LIPERT PROB	
E4 2	oren	BEEK SPACE	DECTORNS	101 1.20	108	21P 1	n 7	n 1			NAMOCAPPI, I					"	20000	IC SATO PILICHOL SAFACIO A	TERLOS RES	LIBHTRIFTOR FARTORIA CONTRACIILO II MARITINAVICI ATT.	
201 0		enc man	1807100	30'00 12					BESS AREA BESSELD S	CTROMAGE BY	TEL BLECTRES	N. ROOMA?	II, FPE FIDA	PROMATE	LEACH.	777	THE CALL AND	THE RESERVE OF THE PARTY OF THE	normane e	INTO HEY ELECTRICA CONTRACTOR INTO ACCUSATION CO.	
							_		Harve day	14	W. IDF 5-012-0	5-902, 5-406, 1	1924.5402	· ·	or room						BUILDING DESCRIPTION ELECTRIC DESCRIPTION
9-1	X 1	DOOR HINDA		491 525		13/8-7		9 1		LIVE	N.3C E.008				-	<u> </u>	2000	all health and account oversection is	A 2010	THE REPORT WAS THE RE.	REMORE AND CONTROL OF SOCIATION AND CONTROL OF SOCIATION CONTROL OF SOCI
011	100	69G F150		35-00 12		SIN	H 7	s (OFFICES I	Bode 1 h Bo	14.2			97	(move	2 MERT HARLTER AND 2 FR, TET BOURNACK F IN DEFICE PRODUCE WALL DATE OF HIS WEBSITE	F FEGURES DE CONTRECE DE	SOMEST SAFEN BY BLOCKINGA, DONTNACIOR FAN TOFINA CONTINUOUS YN FEBBENINA, WATS FAN TO BLA SOMEWOULLY BRING COLLYES HOWS MENE OME MOPTHY FIFTY WITH MICH. MENEROP LIN GLAUTY CAPCESS PRINCAL FORMATION COSTS SECTION OS 150 4 H.	TIMESE OF ST
04	SMIT	9010VS	DRICTORNS	101 1.26	-08	10045	. 7				8.00 E	BUT DATE	100								
														AIR I	NSTRIE	SUTION SCHED	ULE				ARYSICA CATE CHICAPTON MITTOCO PLANCHER
TYPE GO	V.	MI MODEL				(CL(P) 1	MR PE (N)	MAR NC											PEAN	rati	A TREASURE OF THE PROPERTY.
54 1 3		508	346 Si	LOUISTEE SQUART FLICK		97110"	042	- 0													
	A.					961 A.	0001	% H	1												
12 11 2	7,	CC (100	N1 79	LOURSEO DA	ERIUM III	97139	008	-6	1												
11 (2)	-	4	108 6	1000	353.	V16	094	- 8	1				٨								
B4 () 2 B3 () 1	- 11	100	4-UN R	LOURSED IN	E303.0s	010			MOCSATIO	R PLAN, PROVID	DE OPPOSITION	UOE HAR	42								
51 7	47	V		197794	120	777	-														
Ed 1	- 1		3400 DA			910 910	010 M1	- 6	I												
80 5			3-14) (A			2112 2112	361	- 11	1												
GL1H		5050	34 G		SINE			-3/	Δ												DWW-KTRG
DATE:	1.	100	H S	LOUISME	2005	Dr.	008	-11													
																					MECHANICAL SCHEDULES
																					INCO THICKE GOI ILDULES
																					MAD RINE
																					M0.2
																					Plateire 103003
OPYRIGHT GESS Tokupas ir smaller	OPERA DO	GNEERING, MC	tern selecut.																		

CONSIDERATIONS

- Equipment selection and efficiency
- Ventilation strategy
- Distribution ducting

