

BEYOND ENERGY

Justifying PHIUS for Affordable Housing

PHIUS CONFERENCE / SEPTEMBER 21, 2018 / BOSTON



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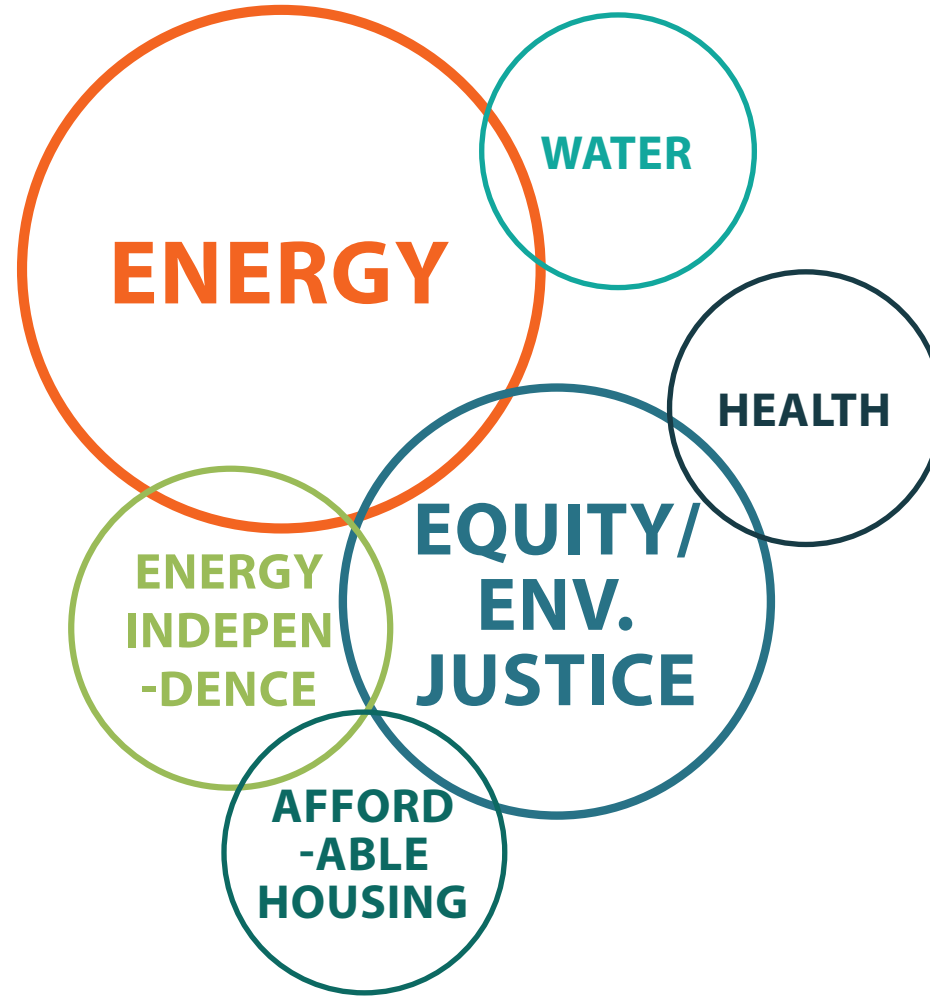


PERFORMANCE
DRIVEN DESIGN.

LHBcorp.com

precipitate
ARCHITECTURE PLANNING RESEARCH

BEYOND ENERGY: Justifying PHIUS for Affordable Housing



CURRENT STATE OF AFFORDABLE HOUSING & FUNDING

Data that city staff members presented to the council Thursday show that barriers to housing access have been in place for decades and that the disparities are stark.

Most Minneapolis residents of color are renters, while most white residents own homes. **Of cost-burdened households in the city** — those that pay 30 percent of their income or more for housing — **about 75 percent are renters.**"

Minneapolis leaders look to tackle affordable housing 'crisis,' Emma Nelson, Star Tribune, August 3, 2017

Gov. Mark Dayton proposes about \$100 million for affordable housing as part of his 2018 bonding proposal. **Such contributions**, while well-intended and valuable to the beneficiaries, **result in too few affordable-housing units** to make a real difference, often at a disproportionate cost to taxpayers.

Affordable housing unchained: We don't need more subsidies in Minnesota. We need fewer rules and fees., Peter Coyle, Star Tribune, April 6, 2018

BEST USE OF PUBLIC FUNDING?

*Why should
we spend
public money
on **PHIUS**
for Affordable
Housing...*

*...rather than
spending
public money
on **more units**
of Affordable
Housing?*

BEYOND ENERGY: Justifying PHIUS for Affordable Housing

PHIUS+ 2015 REQUIREMENTS

- High-performance building envelope
 - Thermal comfort
 - Moisture control
 - Durability
- Fresh air requirements
 - Direct bedroom supply
 - MERV 8 (MERV 12)
 - Limited exposure to combustion gas
- DHW design

OCCUPANT BENEFITS

- Resilience
 - extreme weather
 - power outages
 - housing cost uncertainty
- Remediation of environmental pollution
- Increased occupant comfort
- Increased occupant health
 - reduction in mold, bacteria, dust, pests
 - cardiovascular
 - stress

COMMUNITY BENEFITS

- Lower turnover = connection to community
- Resilience
- Proactive care for vulnerable populations
- Economics
- Emissions
- Prototype

OWNER BENEFITS

- Funding opportunities
- Reduced maintenance/operation costs
 - utilities
 - envelope durability (3rd party verified)
 - lower turnover

For more information on some benefits, see Norton, Ruth Ann, Brendan Wade Brown, Kiki Malomo-Paris, and Elizabeth Stubblefield-Loucks. "Non-Energy Benefits of Energy Efficiency and Weatherization Programs in Multifamily Housing: The Clean Power Plan and Policy Implications." *Green & Healthy Homes Initiative*, September 2016.

PHIUS BUILDING PROJECT METRICS

- Climate Zone 6A
- Floor Area 53,167 SF
- Units 59
- Occupants 156
- Density 341 SF/Occupant
- Envelope 56,200 SF
- Envelope/iCFA 1.06



TIMELINE

- **SPRING 2016**
Schematic Design PHI Feasibility Study
Targeted PHI due to neighborhood demand and developer interest
- **SPRING-SUMMER 2017**
Design Development
PHIUS+ 2015 chosen as rating system, iterative WUFI Passive models
- **FALL 2017**
PHIUS Review Begins
Three rounds of submissions
- **APRIL 2018**
Achieved PHIUS+ 2015 Pre-Certification
- **AUGUST 2018**
Construction Start
PHIUS Verifier engaged throughout construction process

HOLLAND NEIGHBORHOOD, MINNEAPOLIS, MINNESOTA



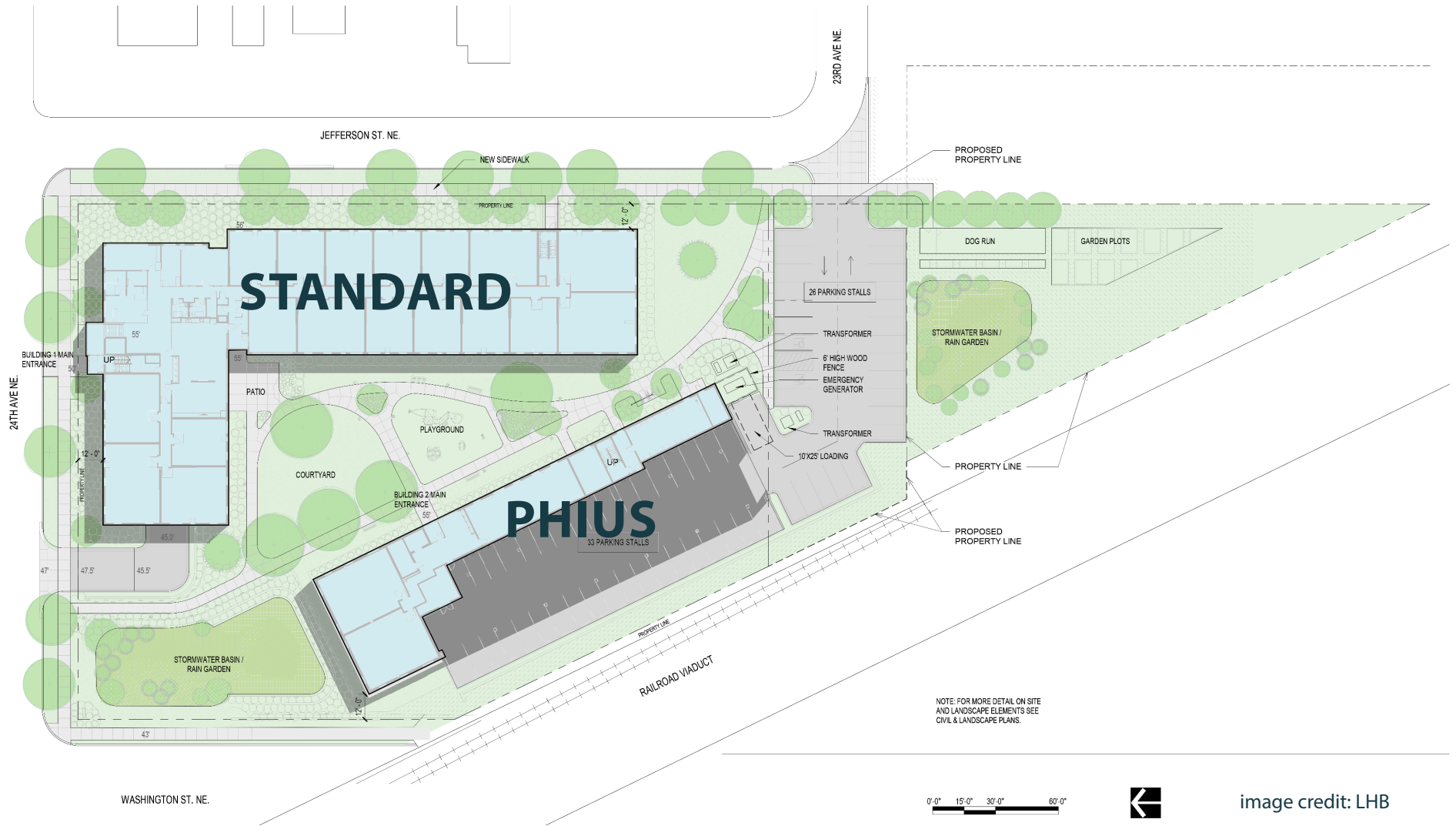
image credit: Google

PROJECT SITE



image credit: Google

PROJECT SITE

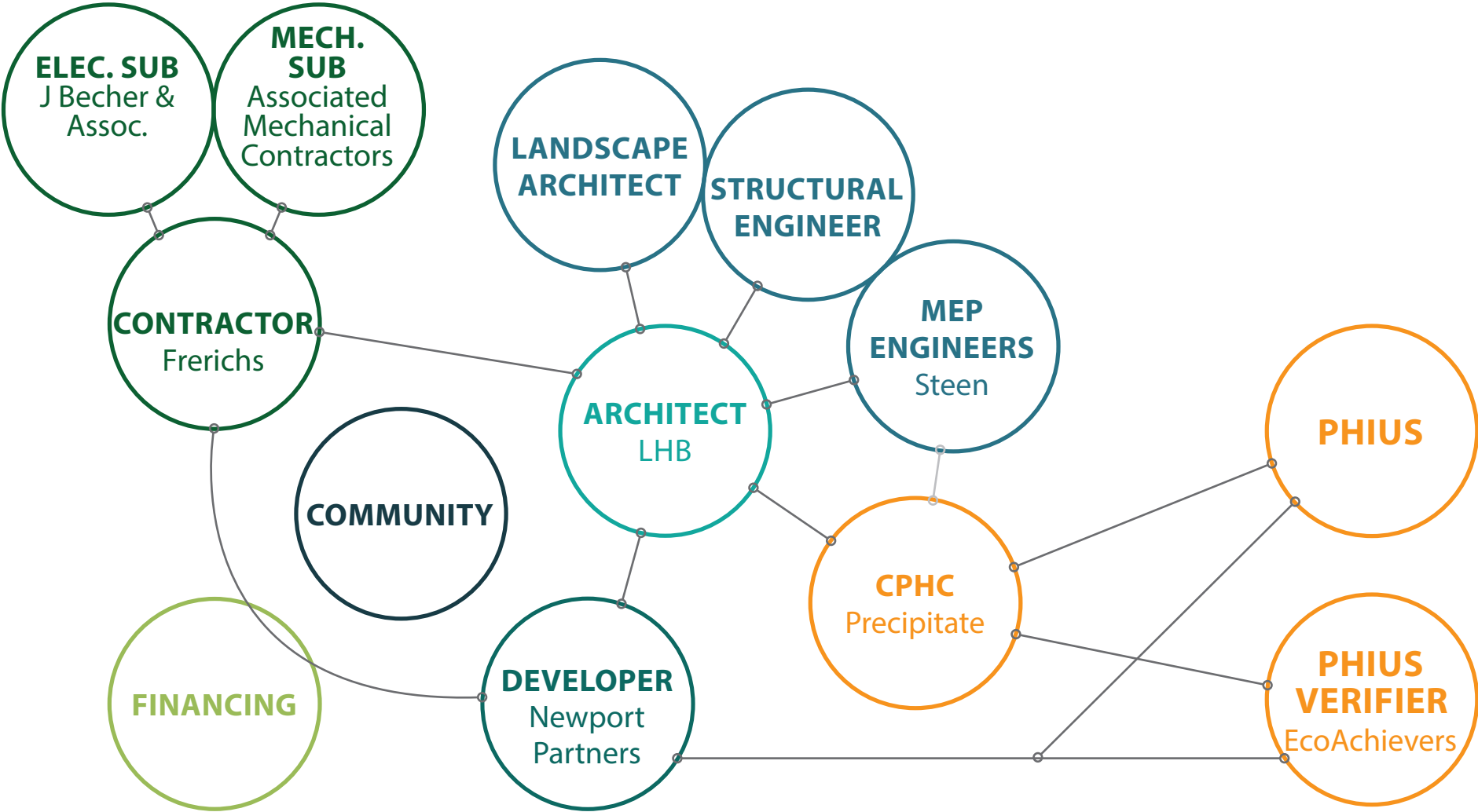


HOOK & LADDER

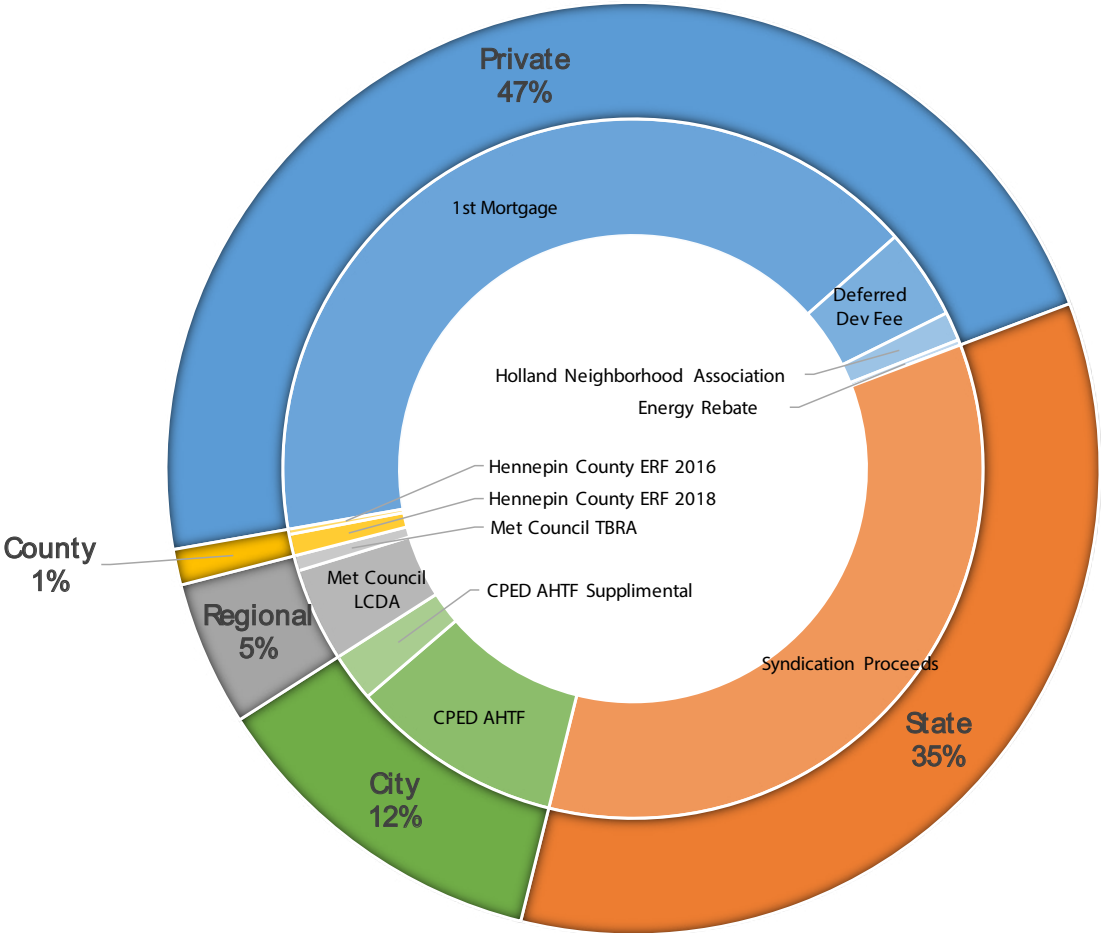


image credit: LHB

TEAM RELATIONSHIPS



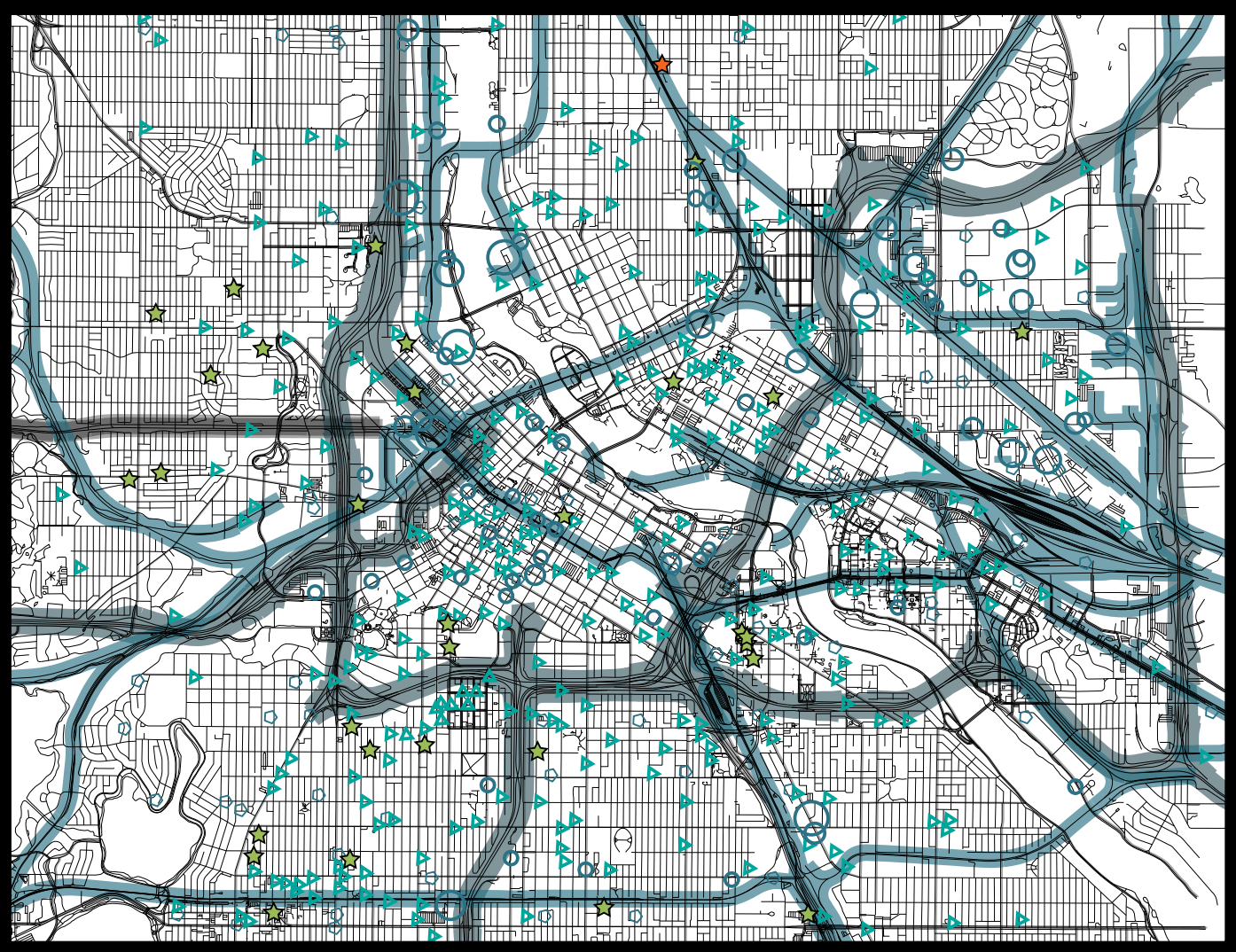
DEVELOPMENT FUNDING SOURCES



**PHIUS BUILDING
TOTAL COST**
Excluding site
\$10,020,951

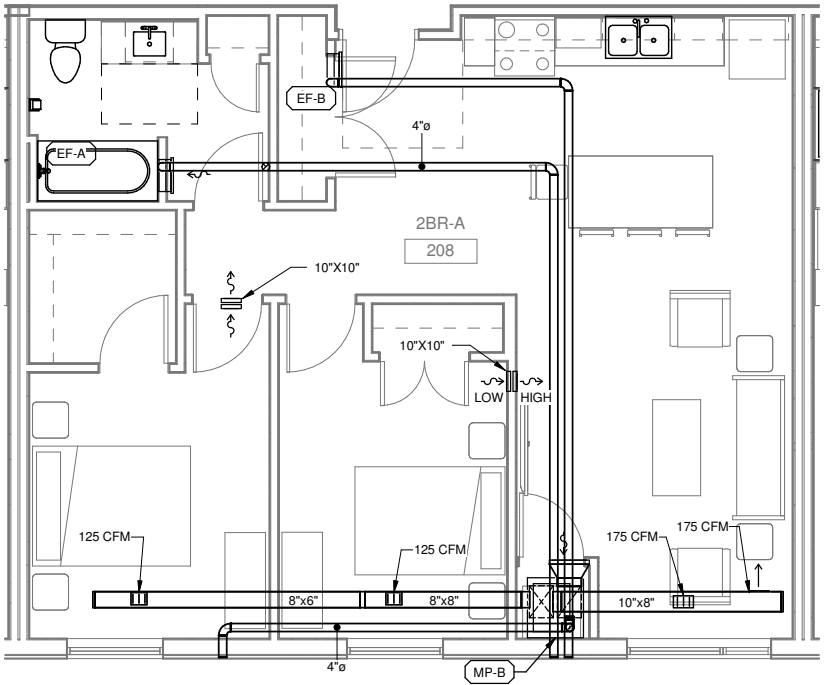
**STANDARD BUILDING
TOTAL COST**
Excluding site
\$9,547,675

AFFORDABLE HOUSING IN TWIN CITIES



CONTINUOUS FRESH AIR SUPPLY - DIRECT TO BEDROOMS

STANDARD



PHIUS

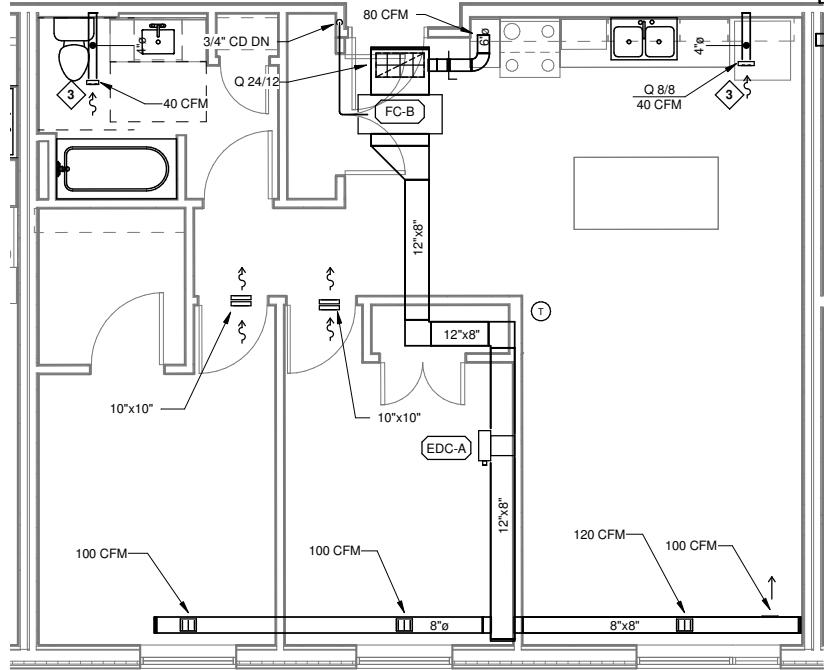


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HIGH-PERFORMING ENVELOPE & MECHANICAL SYSTEM

ENVELOPE

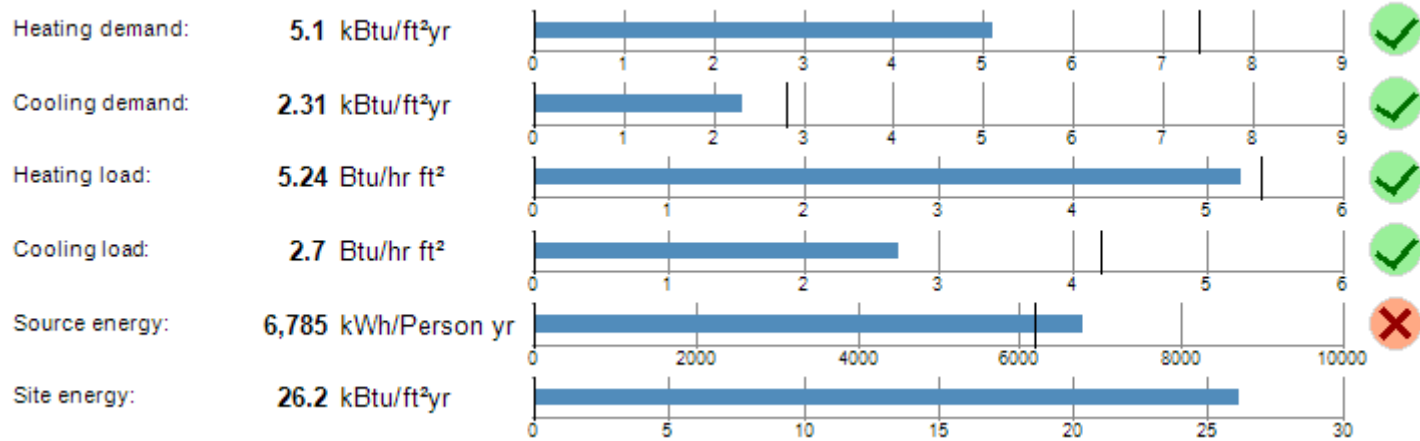
Roof Insulation	R-55
Wall Insulation	R-19 + R-9.6 CI (R-29.7 total wall assembly)
Above Parking	R-50 CI
Slab Insulation	R-20 CI
Awning Window	U-0.17, SHGC 0.2
Fixed Window	U-0.15, SHGC 0.27

SYSTEMS

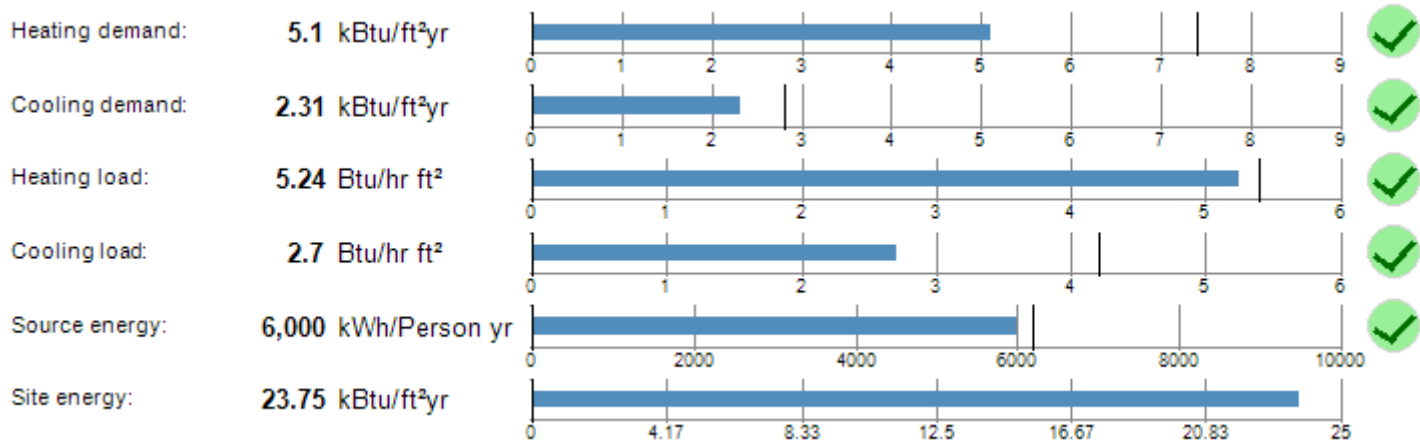
HVAC System	VRF with Centralized ERV
Lighting	LED
Dryers	Heat Pump mixed with Standard
DHW	Gas with VRF Preheat
Solar	40 kW Rooftop

CERTIFICATION METRICS

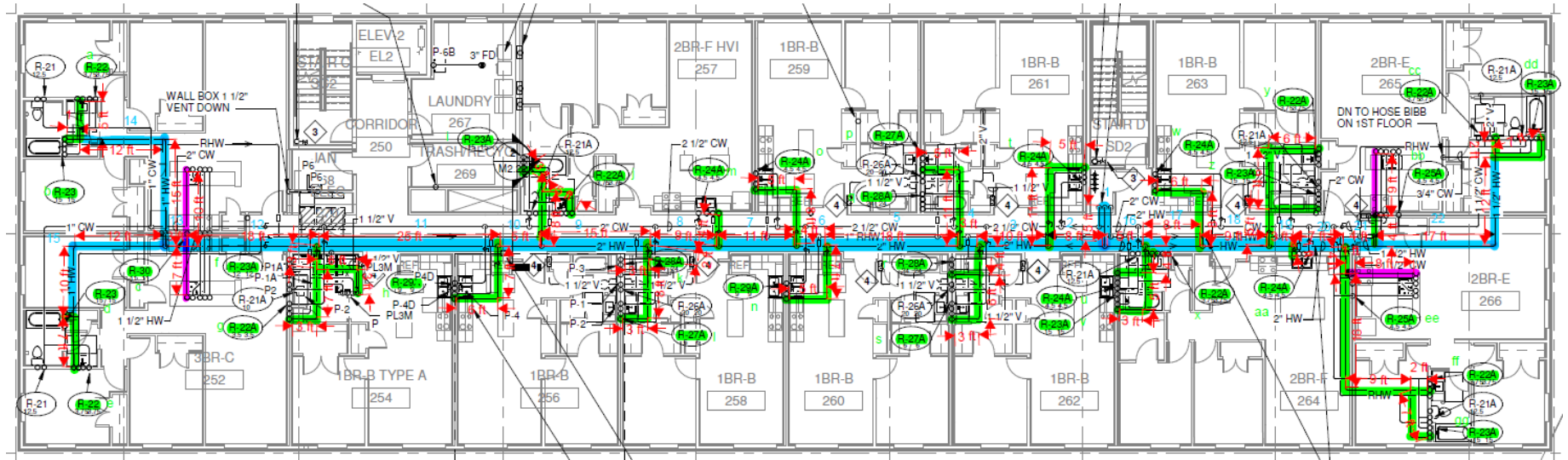
WITHOUT SOLAR PV



WITH SOLAR PV

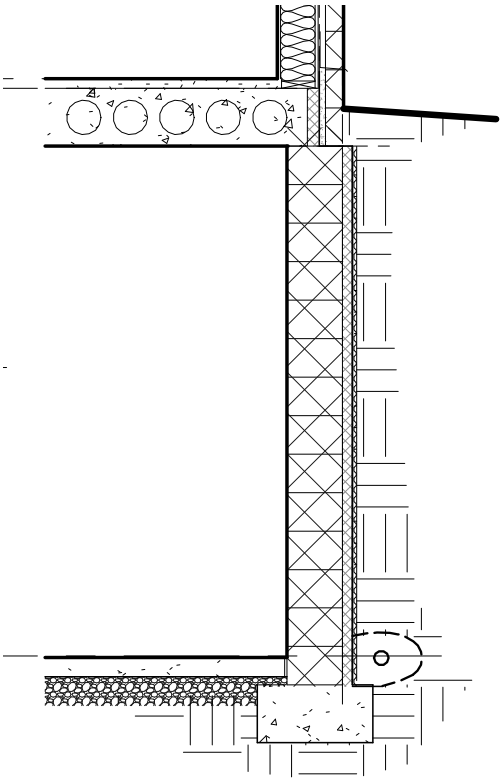


DOMESTIC HOT WATER

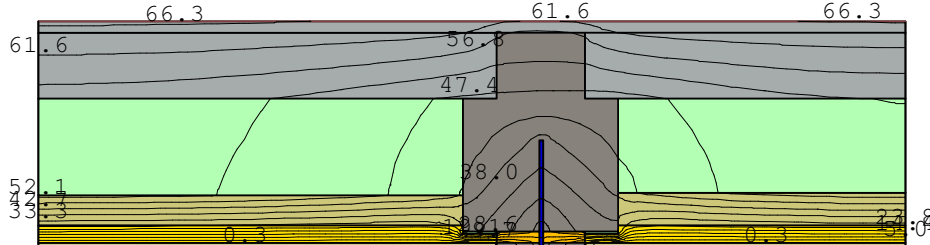
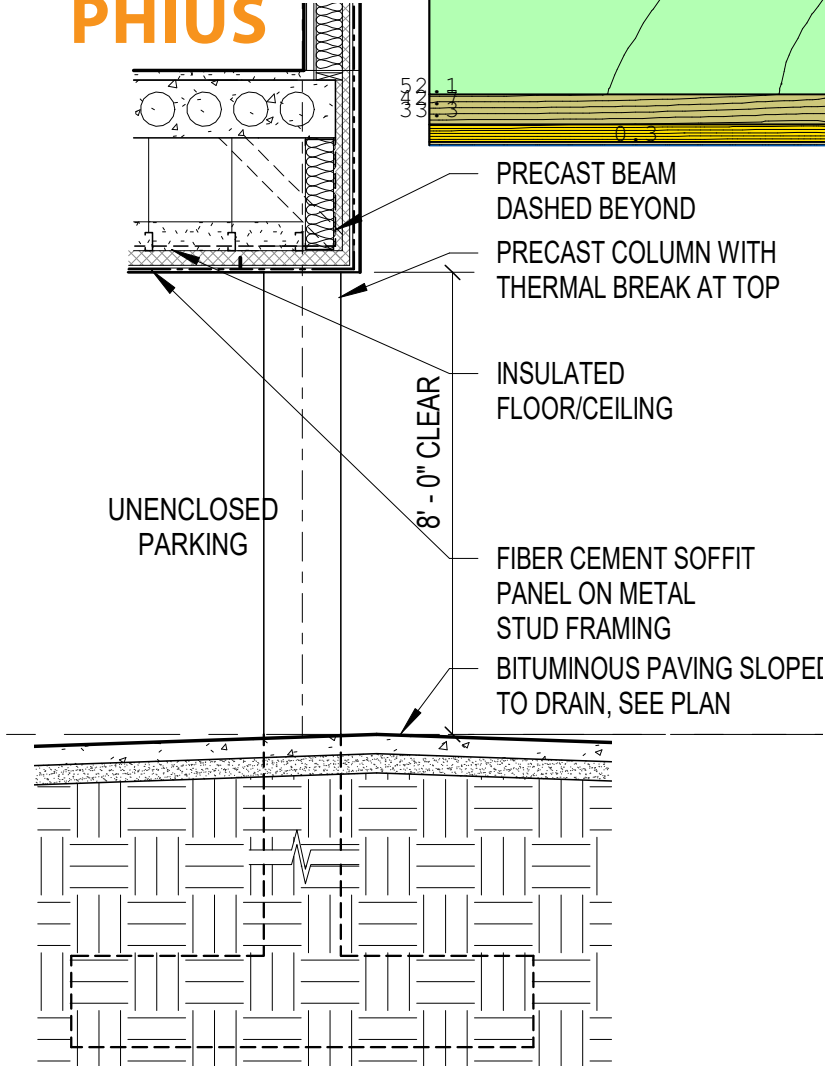


CONSTRUCTION SAVINGS - PARKING

STANDARD

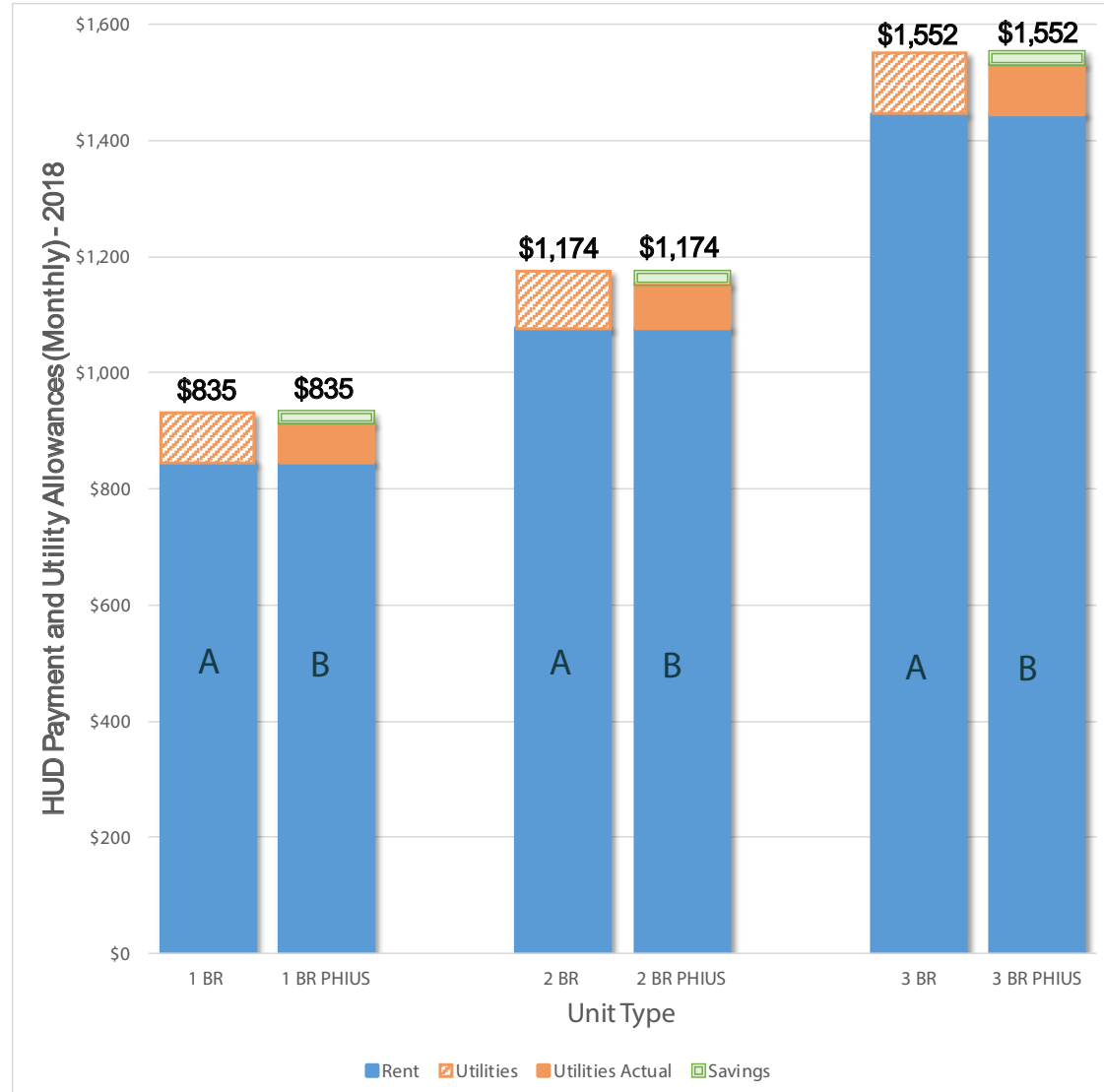


PHIUS



- PRECAST BEAM
DASHED BEYOND
- PRECAST COLUMN WITH
THERMAL BREAK AT TOP
- INSULATED
FLOOR/CEILING
- 8'-0" CLEAR
- FIBER CEMENT SOFFIT
PANEL ON METAL
STUD FRAMING
- BITUMINOUS PAVING SLOPE
TO DRAIN, SEE PLAN

STRUCTURING TENANT PAYMENT FOR ROI



HUD worksheet

MINNEAPOLIS PUBLIC HOUSING AUTHORITY
1001 Washington Avenue North
Minneapolis, MN 55401-1043
CENDEX 5175

A = Multiple Dwelling (any building with 2 or more units)
D1 = Townhouse, Duplex or Double Burglar
SF = Single Family Dwelling

To calculate the utility allowance chart simply start with the Payment Standard amount and then subtract the amounts listed below for all the utilities which the participant (tenant) pays. This equals the Net Rent. If the Owner's proposed rent is greater than the Net Rent (payment standard minus the utilities), this unit may be considered NOT affordable for the Housing Choice Voucher Program. Be sure to use the proper column for the bedroom size and the proper unit type. The Range and Participant amounts are for participant owned appliances, so do not add them if they are provided by the owner.

Utility/Appliance	1 Bedroom		2 Bedrooms		3 Bedrooms		4 Bedrooms		5 Bedrooms		6 Bedrooms										
	A	SF	A	SF	A	SF	A	SF	A	SF	A	SF									
HEATING - Gas	45	78	85	87	101	114	87	128	147	61	131	168	79	162	182	81	162	192	93	184	208
- Electric	12	19	18	14	24	23	22	29	29	24	29	42	24	29	44	29	37	46	33	42	63
COOKING - Gas	3		4		4		7		5		8		5		8		5		8		5
- Electric	2		2		2		2		2		3		2		3		2		3		4
WATER ELECTRIC	11	12	15	12	21	20	19	24	24	24	30	21	21	37	24	31	38	28	35	53	53
WATER HEATER - Gas	11		14		17		19		23		23		23		23		23		24		24
- Electric	4		7		8		10		10		11		11		11		11		13		13
TRASH COLLECTION	19		19		19		19		19		19		19		19		19		19		19
WATER & SEWER	19		37		41		68		72		84		84		84		84		96		96
RANGE	41		41		41		41		41		41		41		41		41		41		41
REFRIGERATOR	37		37		37		37		37		37		37		37		37		37		37
Appropriate Payment Standard	763		932		1174		1552		1742		2003		2289								
Less (+) Total Allowance for this unit																					
Equals (Y) Net Rent																					
Write difference in box																					
Fair Market Rent	711		864		1089		1547		1812		2084		2356								
Payment Standards (% of HUD FMR)	107%		108%		108%		100%		96%		96%		97%								

1001 WASHINGTON AVENUE NORTH MINNEAPOLIS, MN 55401-1043 PHONE: (612) 343-1400 FAX: (612) 335-4427 WWW.MPHA.ONLINE.ORG
EQUAL HOUSING OPPORTUNITY - EQUAL EMPLOYMENT OPPORTUNITY

Path A - Tenant pays utilities
Path B - Owner pays utilities

**PATH B:
\$13,000
ANNUAL SAVINGS**

STRUCTURING UTILITY DELIVERY FOR ROI

Utility Supplied Metering (Original Design)

120 Electric meters
each with monthly individual service charges
61 Gas meters
each with monthly individual service charges
Residential energy rate*

Required permissions through utility and tenant agreements to obtain unit energy data. Math required after receiving utility information to compare Standard to PHIUS building

Annual Utility Service Charges (118 units): \$ 27,289

Wireless Monitors (Proposal Request)

2 Electric meters
Install wireless sub-meters, individual service charge savings
2 Gas meters
Install wireless sub meters, individual service charge savings
Commercial energy rate*
Rate change savings
Easy access to unit energy data. 3rd party provides energy data formatted to compare Standard to PHIUS building. 3rd party provides: high usage alerts, online access to data, original utility bills, and data formatted to upload to Energy Star and B3 Benchmarking.

Cost Chages:

One time install - Electrical cost:	\$ 60,000 (Maximum)
One time install - Mechanical cost:	\$ 0
One time - 3rd party database set up fee:	\$ 5,500
One time - design additional services**:	\$ 5,000
TOTAL upfront cost:	\$ 70,500

Annual Energy Services cost:	\$ 1,920
Annual Utility Service Charges:	\$ 0
Annual Utility Savings***:	(\$ 32,580)

Payback period: 2.3 years

*In addition to the commercial rate being lower than the residential rate. In 2017, MN utility regulators approved Xcel Energy rates to increase 10.6% for residential and 6.9% for commercial over 4 years. Further widening the gap between commercial and residential rates, allowing the project to see additional savings annually for changing over to the commercial rate.

** Design Additional Services include: LHB coordination, STEEN redrawing distribution panels, resizing electrical loads, voltage drop, and riser locations and distribution plans.

*** Annual Utility Savings include money saved on individual utility supplied meter service charges, and energy cost savings from changing over to the commercial rate, based on Xcel Energy Design Assistance (EDA) calculated Energy Use Intensity (EUI) projections for both buildings.

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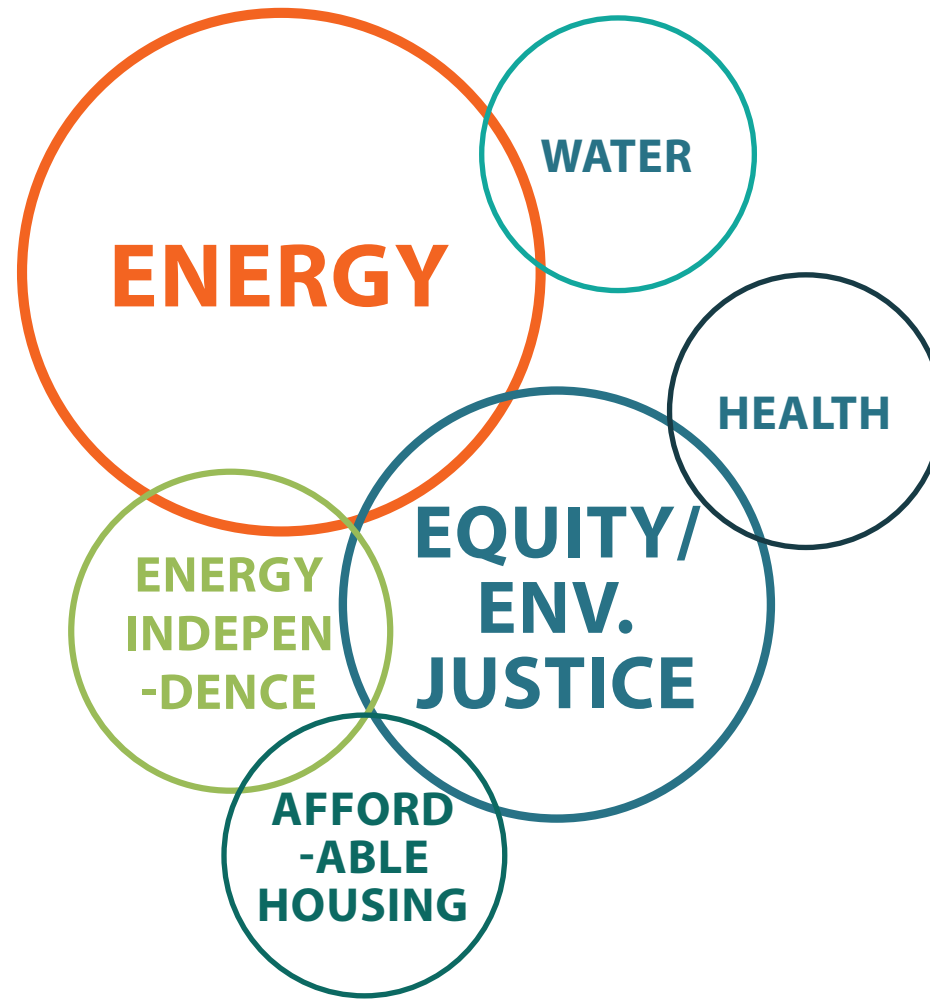
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**WHAT WILL
BE IMPACT
OF PHIUS+
2018?**