

# Mentimeter Questions

- Pull out your phone!
  - Go to: [www.menti.com](http://www.menti.com)
  - Enter code: 7545 3434
- 
- If you have ?s, push the button on bottom right at any time and we can address them at the end



# Optimal Radon System Design

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Chad Robinson | Building Performance Co.

10/31/2023 – AARST International Radon Symposium – Practice and Policy Track

PROTECTING, MAINTAINING AND IMPROVING THE HEALTH OF ALL MINNESOTANS

# What is Needed to Fix this New House?



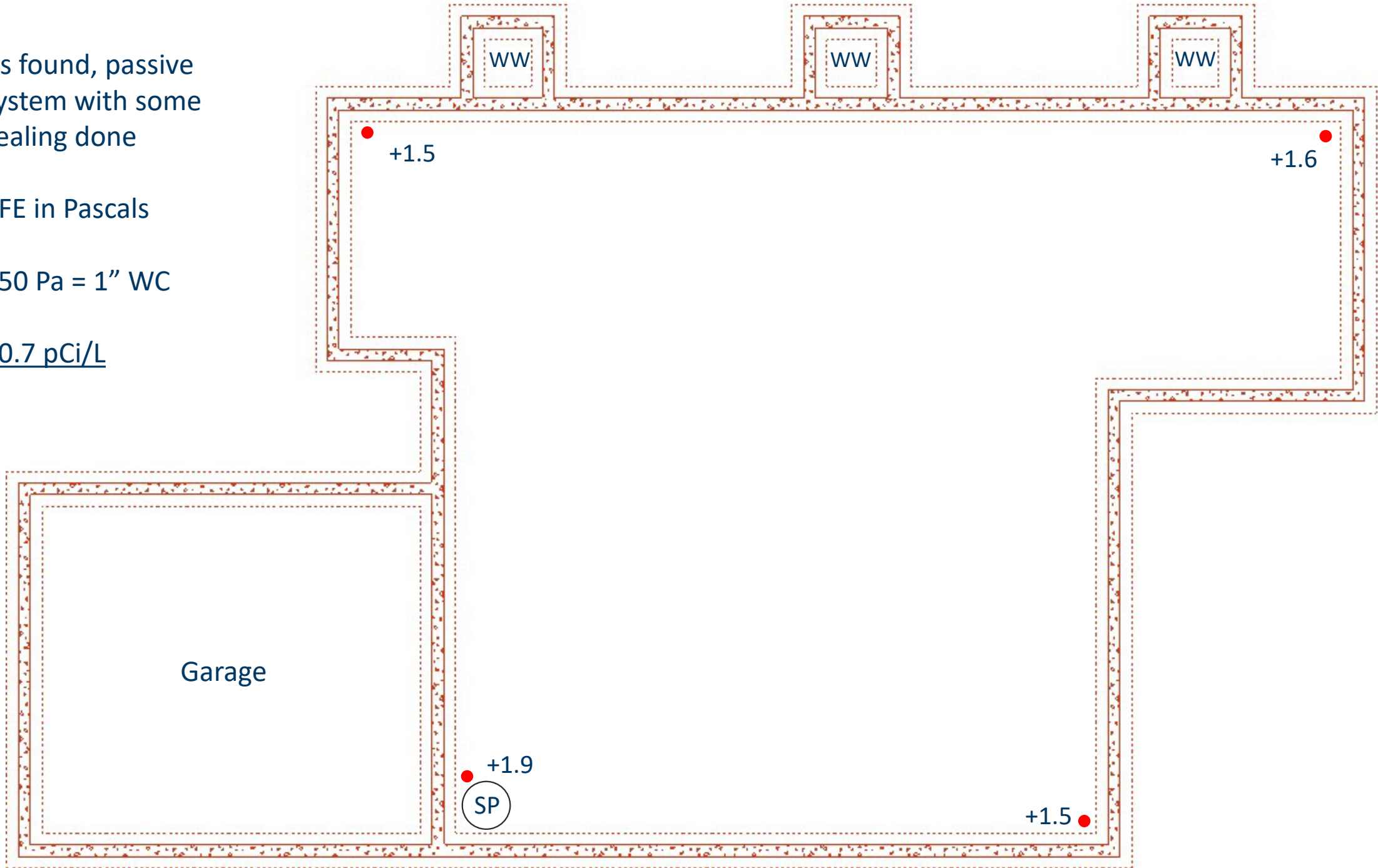
- Built in 2020
- RRNC per MN Code
- 1,900 basement footprint
- Conscientious Builder
- 1.05 ACH50
- 3” passive riser in draintile

As found, passive system with some sealing done

PFE in Pascals

250 Pa = 1" WC

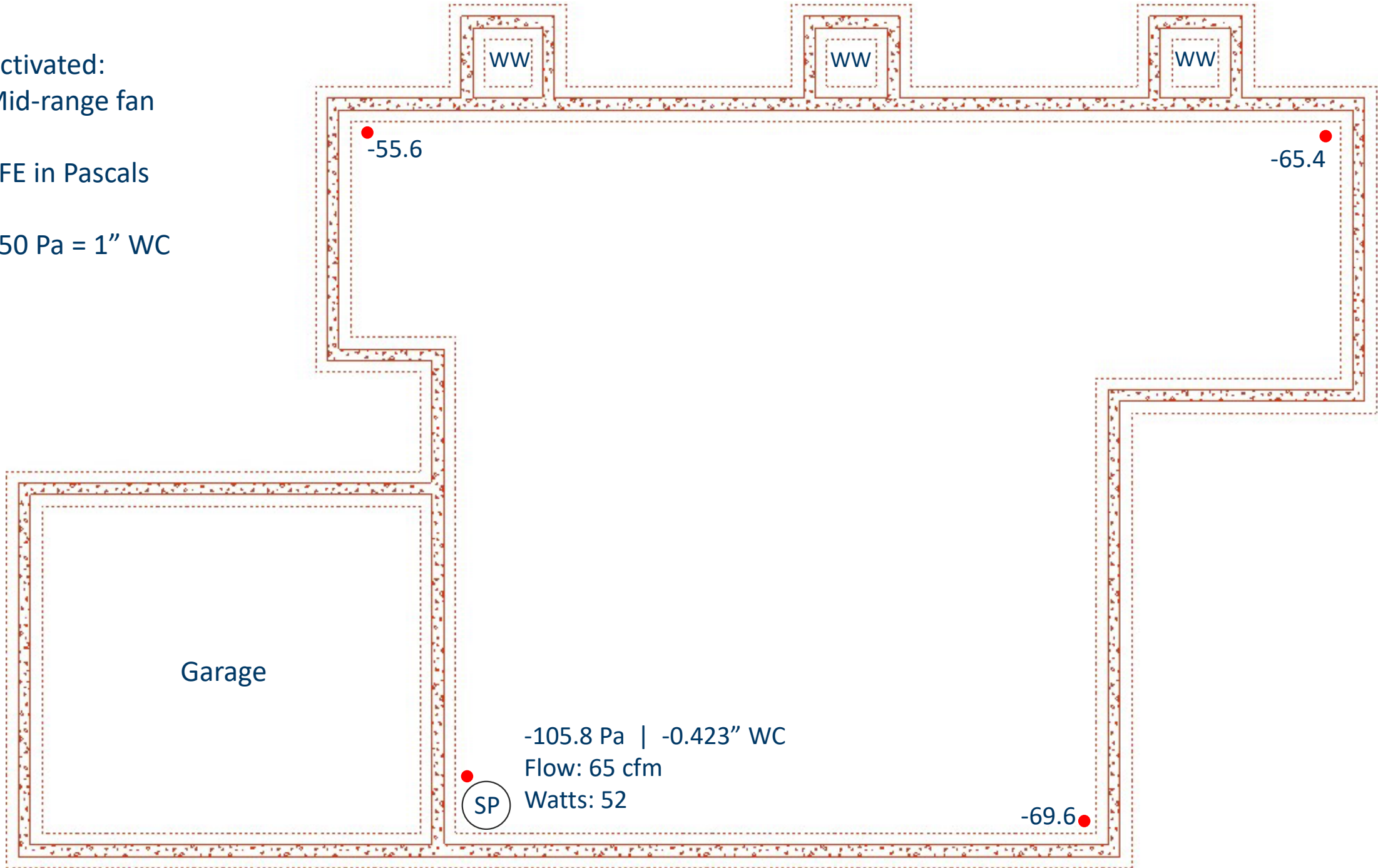
10.7 pCi/L



Activated:  
Mid-range fan

PFE in Pascals

250 Pa = 1" WC



## Mentimeter Question 2

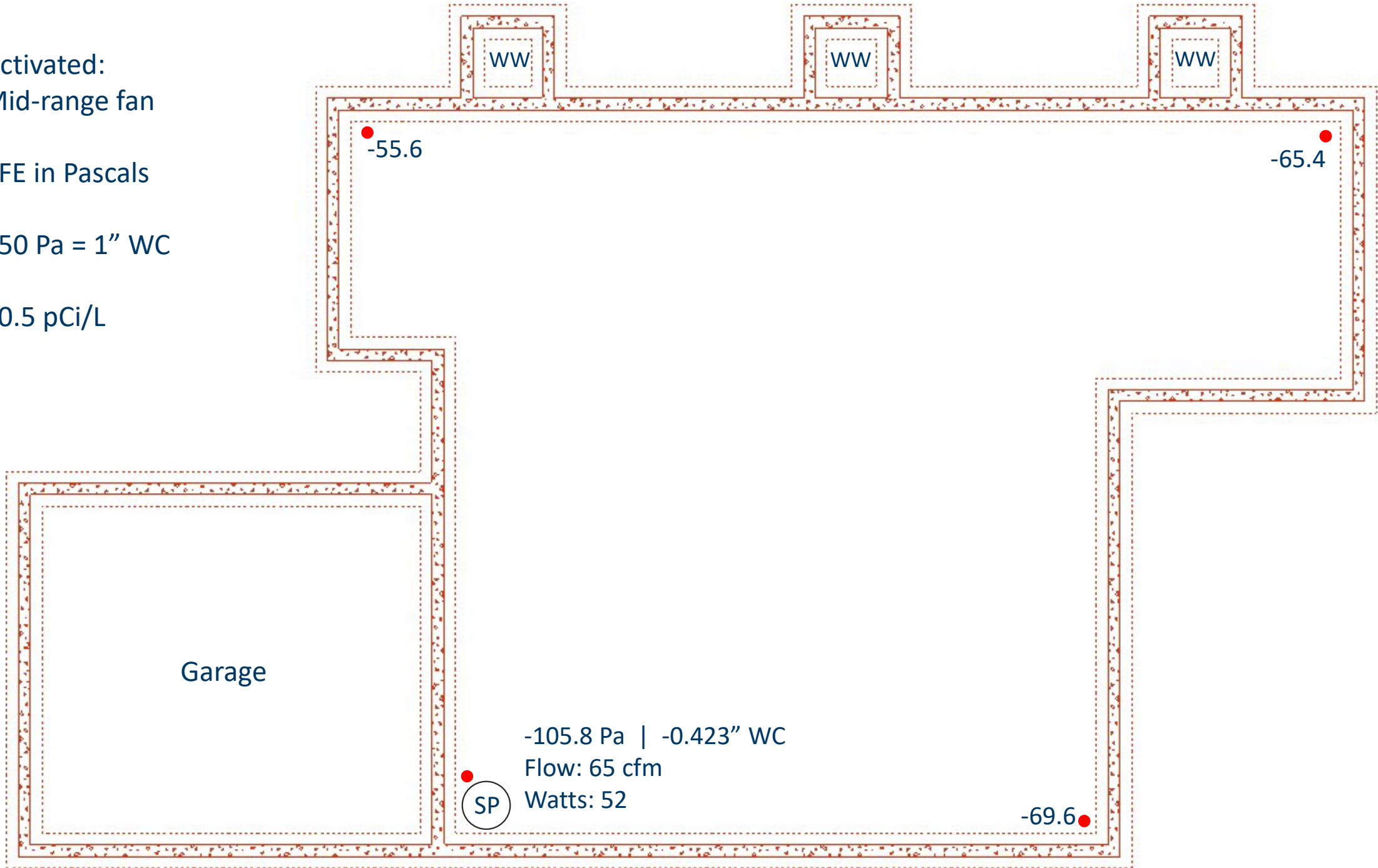
- Is the mid-range fan winning the radon game?
  - Pull out your phone to play along
  - Go to: [www.menti.com](http://www.menti.com)
  - Enter code: 7545 3434

Activated:  
Mid-range fan

PFE in Pascals

250 Pa = 1" WC

<0.5 pCi/L



# Mid-range Fan Operating Costs

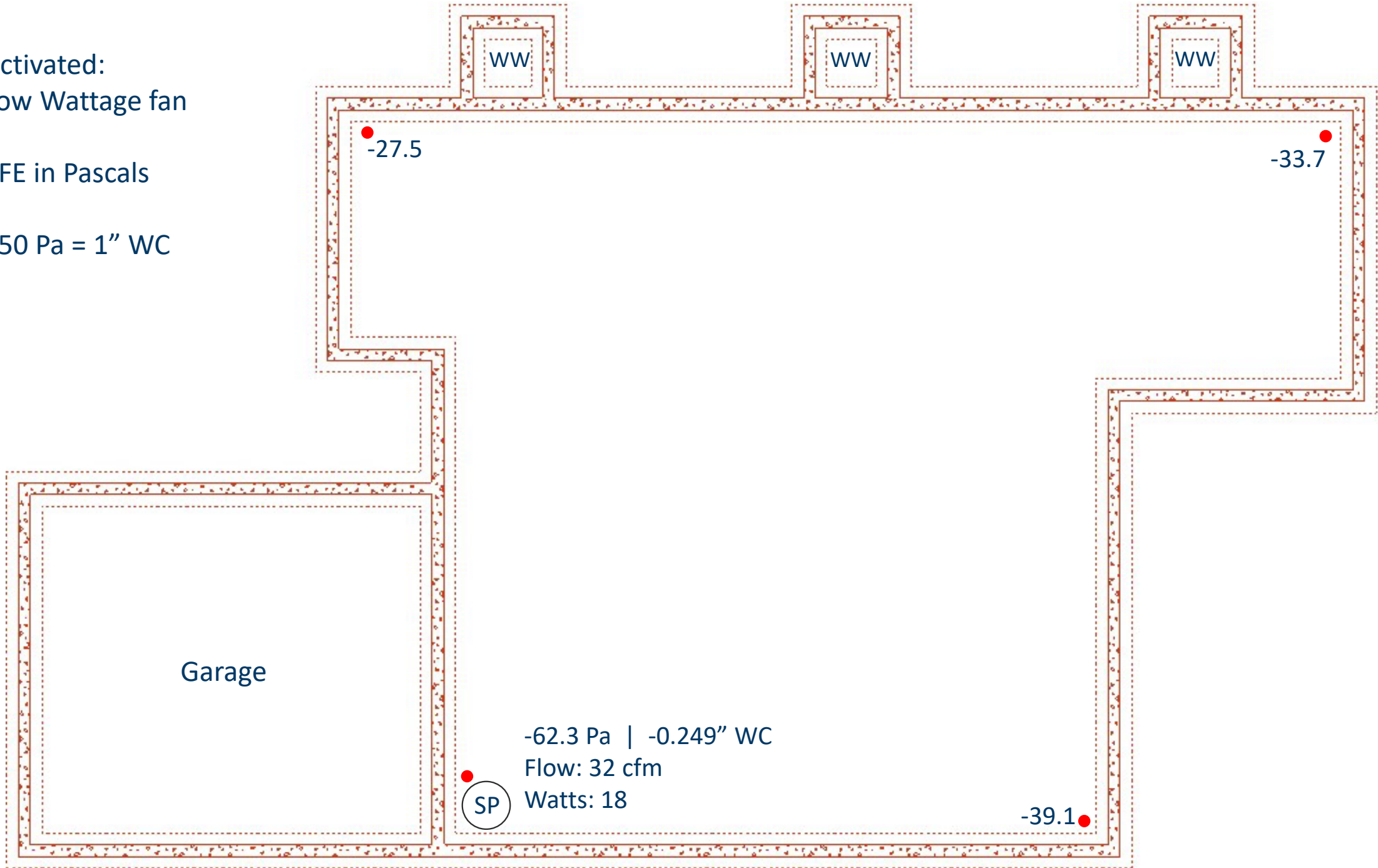
Air Flow	45	CFM	
Average Annual Heating Degree Days	7500		For Minneapolis
Average Annual Cooling Degree Days	823		For Minneapolis
Furnace Efficiency (Gas)	95		As efficient as needed
Furnace Efficiency (Electric)		HSPF	
Air Conditioner Efficiency	17	SEER	13 is national minimum
Cost of gas	11.5	\$/1000ft <sup>3</sup>	
Cost of Electricity	0.115	\$/KWH	For Minneapolis
Cost of added Ventilation	\$183	\$/Year	
Fan Wattage	52	Watts	
Cost of Electricity to run Radon Fan	\$52	\$/Year	
Total Annual Operating Cost of Radon System	<b>\$236</b>		<b>\$/Year</b>



Activated:  
Low Wattage fan

PFE in Pascals

250 Pa = 1" WC



## Mentimeter Question 3

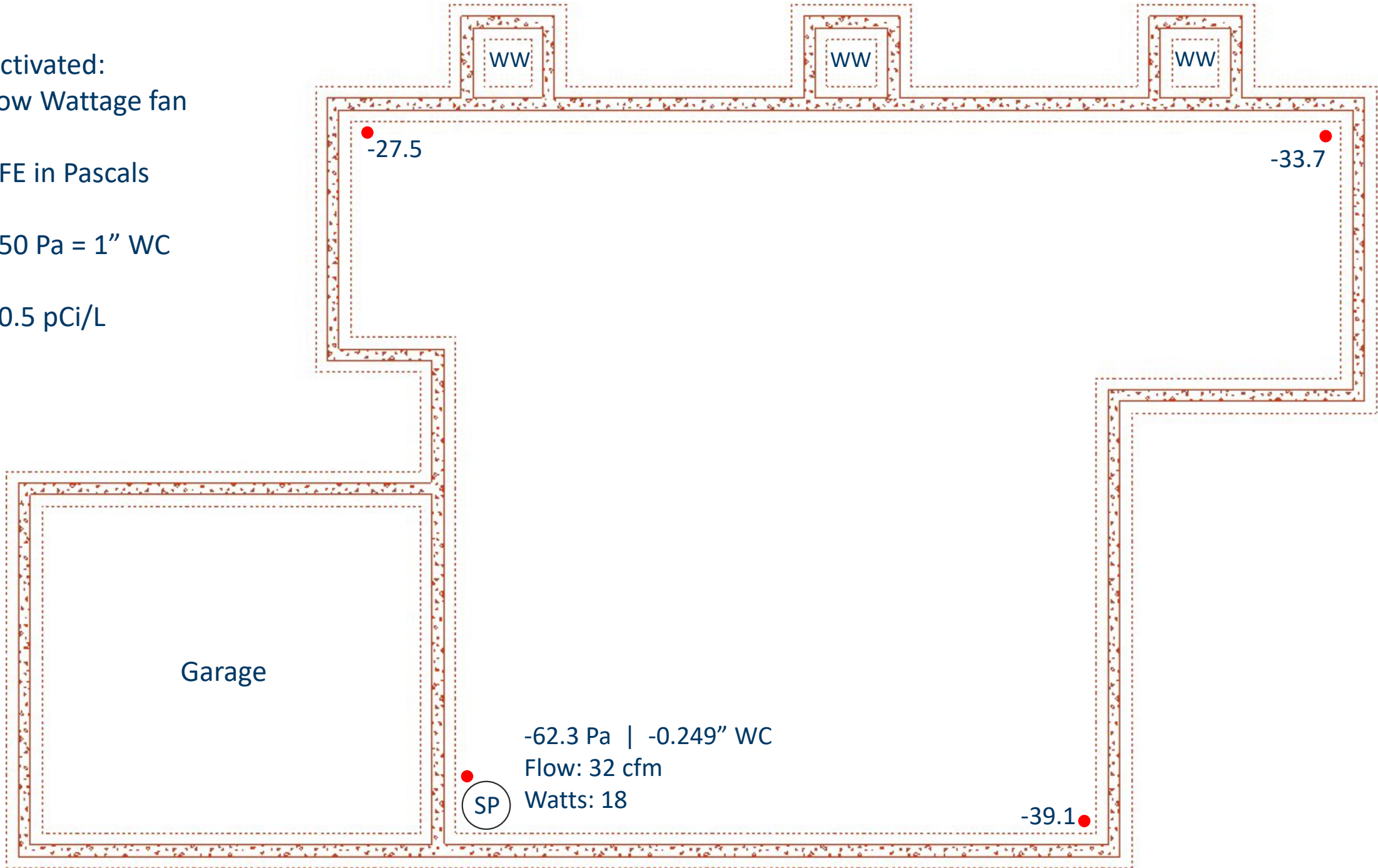
- Is the low-wattage fan winning the radon game?
  - Pull out your phone to play along
  - Go to: [www.menti.com](http://www.menti.com)
  - Enter code: 7545 3434

Activated:  
Low Wattage fan

PFE in Pascals

250 Pa = 1" WC

<0.5 pCi/L



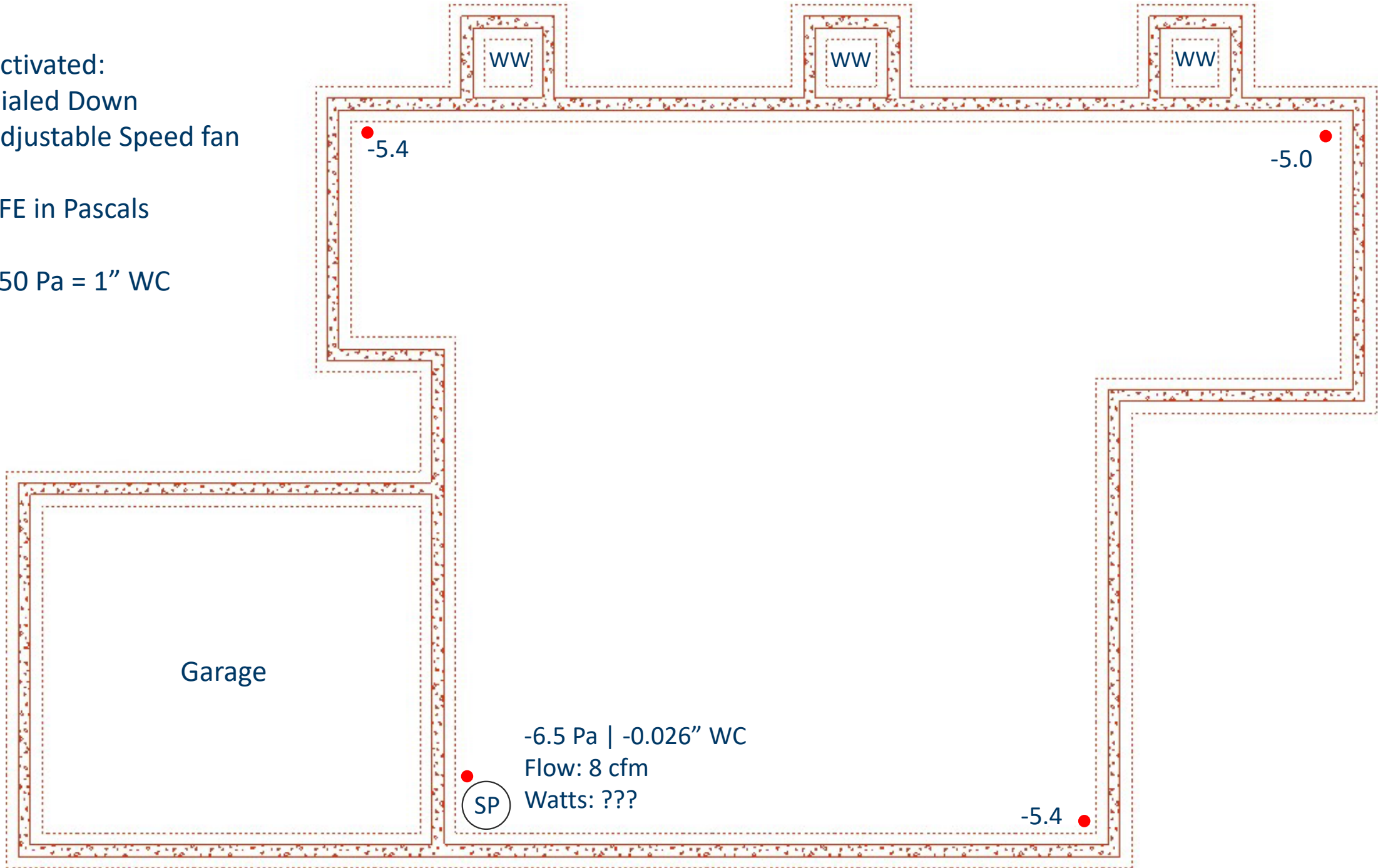
# Low Wattage Fan Operating Costs

Air Flow	20	CFM	
Average Annual Heating Degree Days	7500		For MPLS
Average Annual Cooling Degree Days	823		For MPLS
Furnace Efficiency (Gas)	95		
Furnace Efficiency (Electric)		HSPF	
Air Conditioner Efficiency	17	SEER	
Cost of gas	11.5	\$/1000ft <sup>3</sup>	
Cost of Electricity	0.115	\$/KWH	For MPLS
Cost of added Ventilation	\$82	\$/Year	
Fan Wattage	18	Watts	
Cost of Electricity to run Radon Fan	\$18	\$/Year	
<b>Total Annual Operating Cost of Radon System</b>	<b>\$100</b>	<b>\$/Year</b>	

Activated:  
Dialed Down  
Adjustable Speed fan

PFE in Pascals

250 Pa = 1" WC



# Mentimeter Questions 4-6

- Is the dialed down adjustable fan winning the radon game?
- How much wattage is being used?
- What should we do next?
  - Pull out your phone to play along
  - Go to: [www.menti.com](http://www.menti.com)
  - Enter code: 7545 3434



**PACIFIC SCIENCE  
& TECHNOLOGY, INC.**

LINE LOGGER

2

Volts

Watts

kWh

kWh Reset

120V

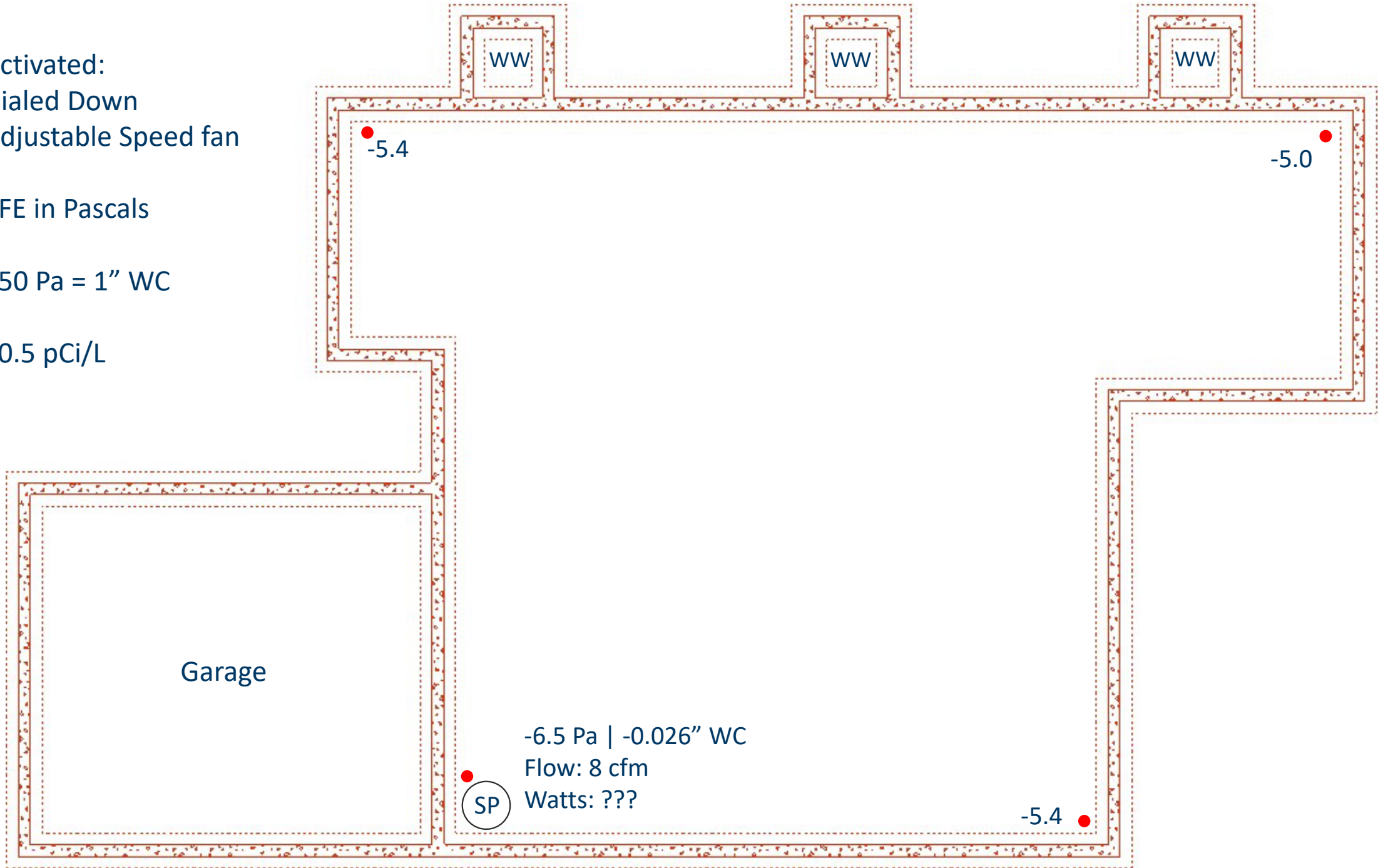
USA

Activated:  
Dialed Down  
Adjustable Speed fan

PFE in Pascals

250 Pa = 1" WC

<0.5 pCi/L





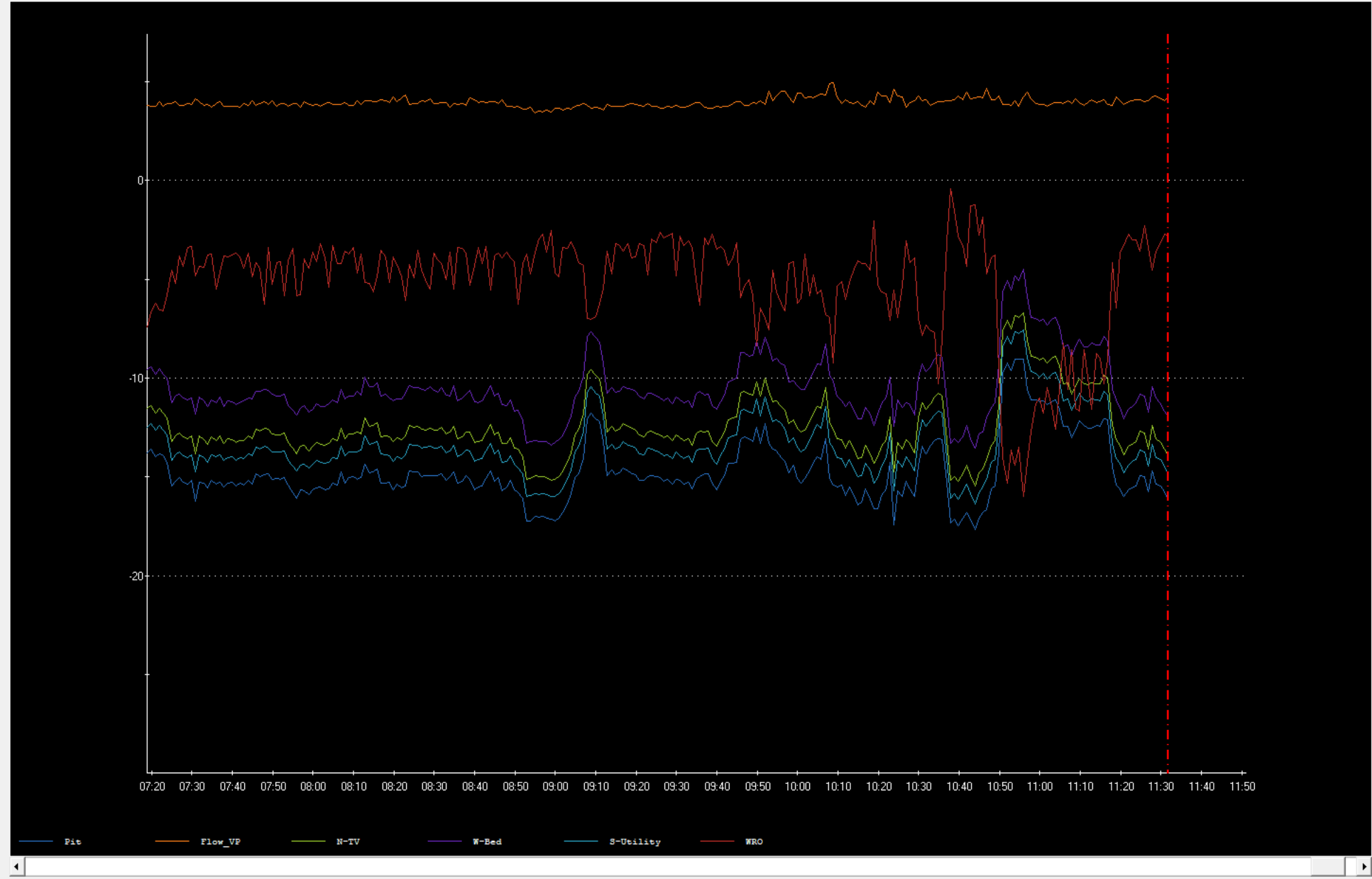
# Dialed Down Adjustable Speed Fan Operating Costs

Air Flow	4	CFM	
Average Annual Heating Degree Days	7500		For MPLS
Average Annual Cooling Degree Days	823		For MPLS
Furnace Efficiency (Gas)	95		
Furnace Efficiency (Electric)		HSPF	
Air Conditioner Efficiency	17	SEER	
Cost of gas	11.5	\$/1000ft <sup>3</sup>	
Cost of Electricity	0.115	\$/KWH	For MPLS
Cost of added Ventilation	\$16	\$/Year	
Fan Wattage	2	Watts	
Cost of Electricity to run Radon Fan	\$2	\$/Year	
<b>Total Annual Operating Cost of Radon System</b>	<b>\$18</b>	<b>\$/Year</b>	

# Additional Attention to Detail can go a Long Way!!

<u>Fan Type</u>	Watts	Airflow from House	Annual Operating Cost	10 Year Operating Cost
Mid-Range	52	45	\$ 236	\$ 2,360
Low Wattage	18	20	\$ 100	\$ 1,000
Dialed Down Adjustable	2	4	\$ 18	\$ 180

Event Baseline POR Fan-On POR Auto T Auto Y Devices MASTER Edit Test Details Results



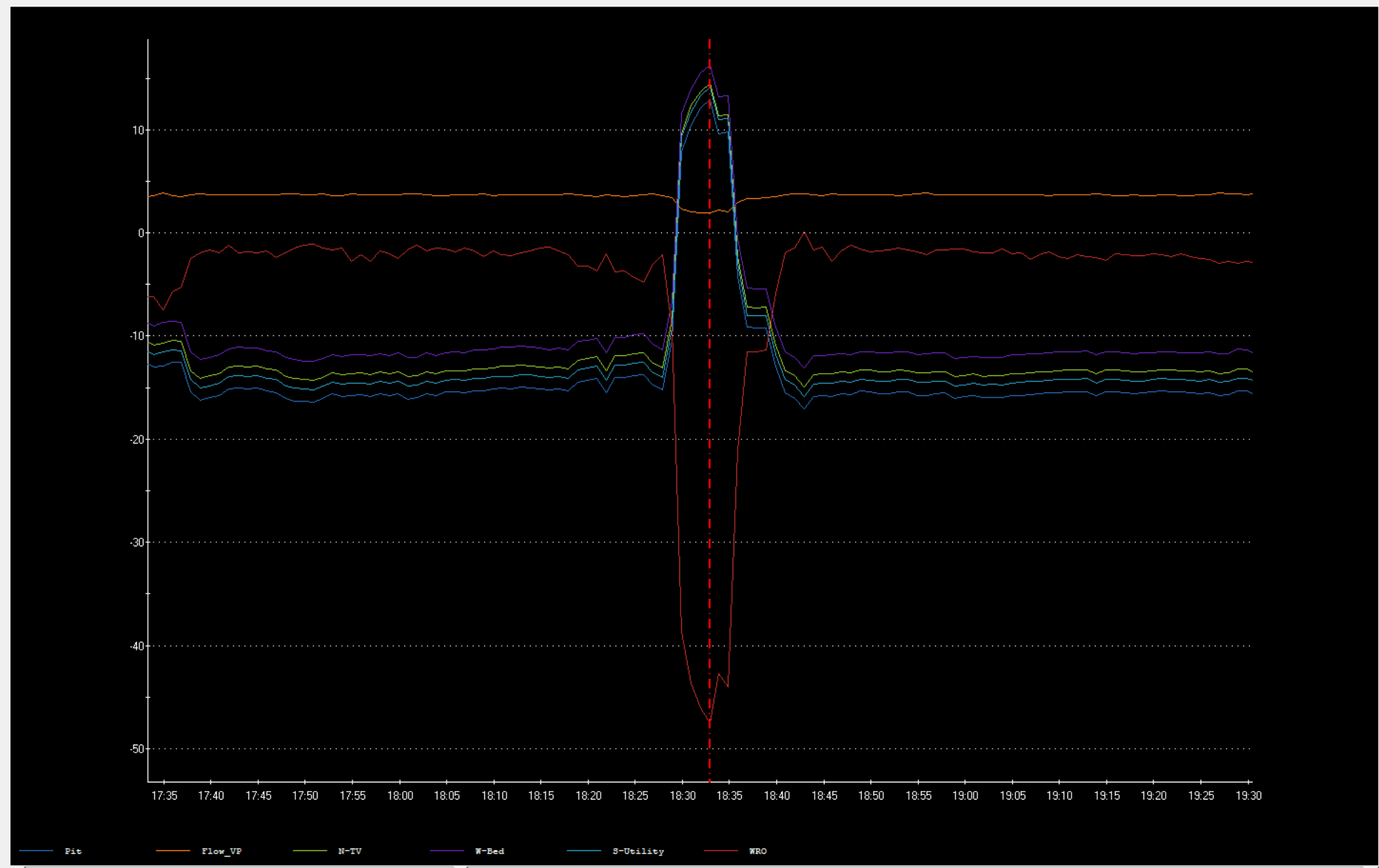
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Obs #: 10010 of 10010

Viewing File:  
Joe\_Kerber\_PM

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<input checked="" type="checkbox"/> N-TV	-13.9
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<input type="checkbox"/> H	0.0

Pit Flow\_VP N-TV W-Bed S-Utility WRO

Event Baseline POR Fan-On POR Auto T Auto Y Devices MASTER Edit Test Details Results

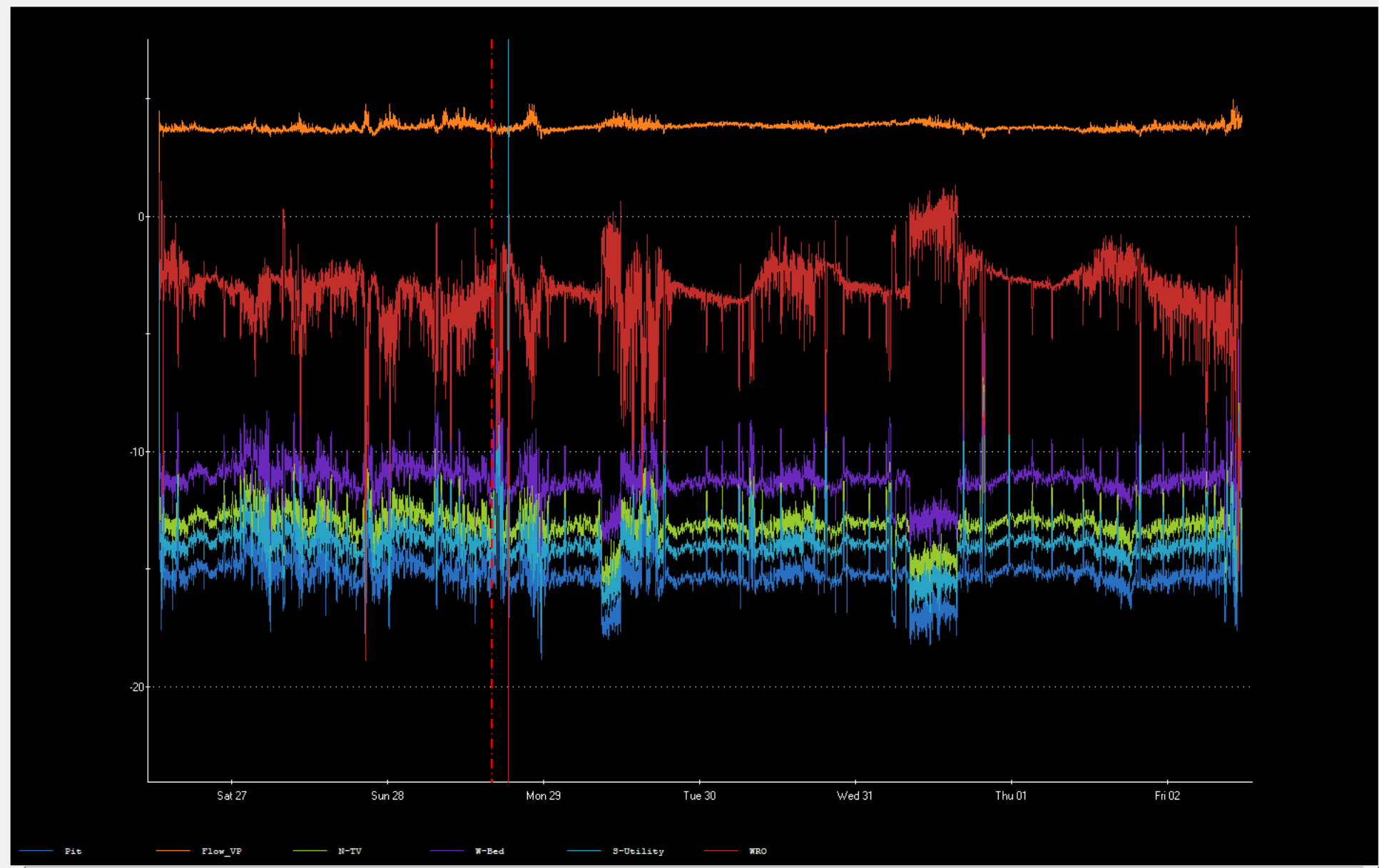


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Obs #: 3231 of 10010

Viewing File:  
[Joe\\_Kerber\\_PM](#)

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Event    Baseline POR    Fan-On POR    Auto T    Auto Y    Devices    MASTER    Edit Test Details    Results



Aug 28 22      16:03:53.65  
 Obs #:          3082 of 10010

Viewing File:  
 Joe\_Kerber\_PM

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# But, Wait. There's More!

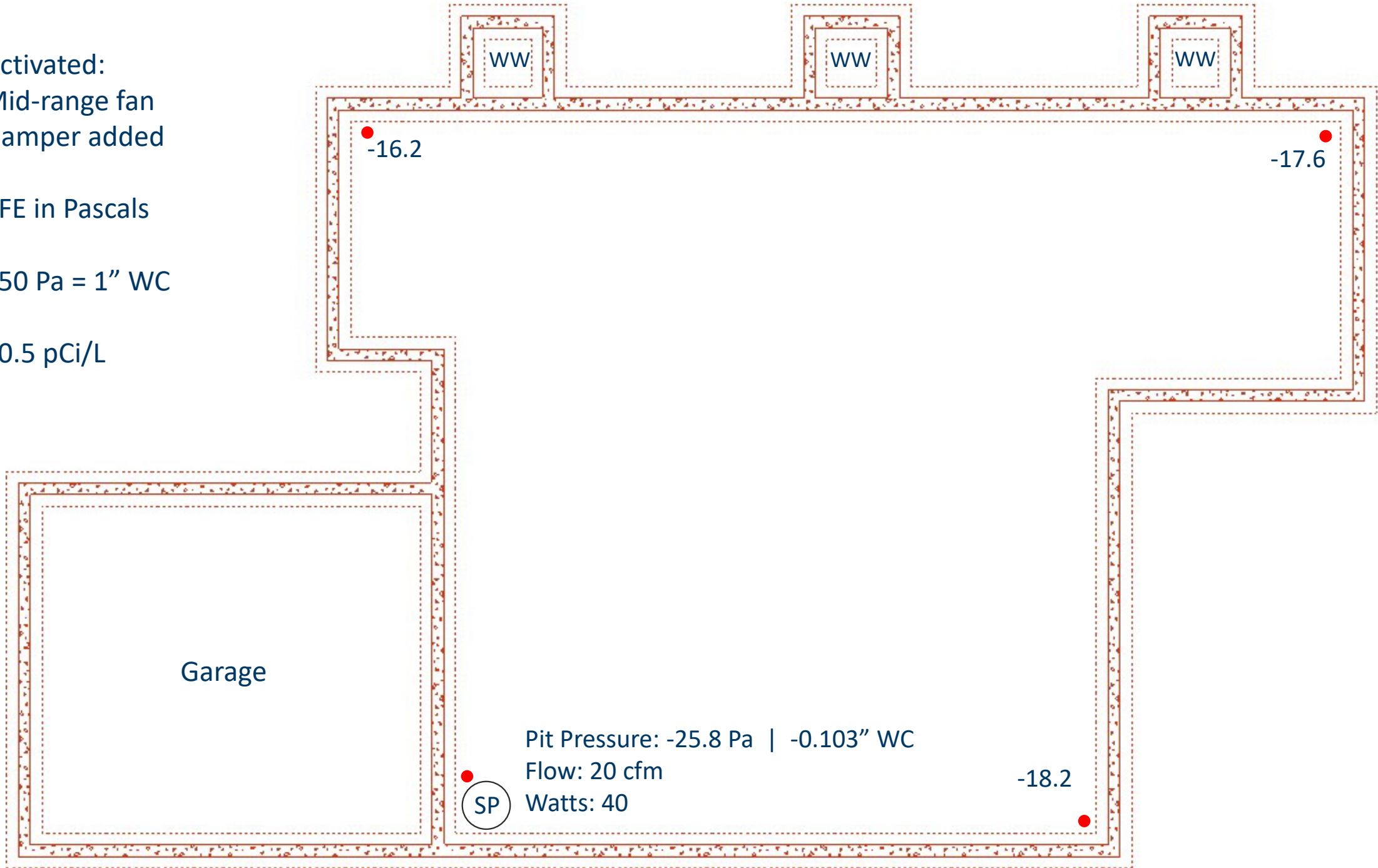
- What if we told you:
  - You can currently save clients money
    - Using pieces and parts already on your truck
  - Savings over time will pay for system costs
  - But this takes knowing a little more info than you currently get

Activated:  
Mid-range fan  
Damper added

PFE in Pascals

250 Pa = 1" WC

<0.5 pCi/L



# Mid-range Fan w/ Damper Operating Costs

Air Flow	13	CFM	
Average Annual Heating Degree Days	7500		For Minneapolis
Average Annual Cooling Degree Days	823		For Minneapolis
Furnace Efficiency (Gas)	95		As efficient as needed
Furnace Efficiency (Electric)		HSPF	
Air Conditioner Efficiency	17	SEER	13 is national minimum
Cost of gas	11.5	\$/1000ft <sup>3</sup>	
Cost of Electricity	0.115	\$/KWH	For Minneapolis
Cost of added Ventilation	\$53	\$/Year	
Fan Wattage	40	Watts	
Cost of Electricity to run Radon Fan	\$40	\$/Year	
Total Annual Operating Cost of Radon System	<b>\$93</b>	<b>\$/Year</b>	

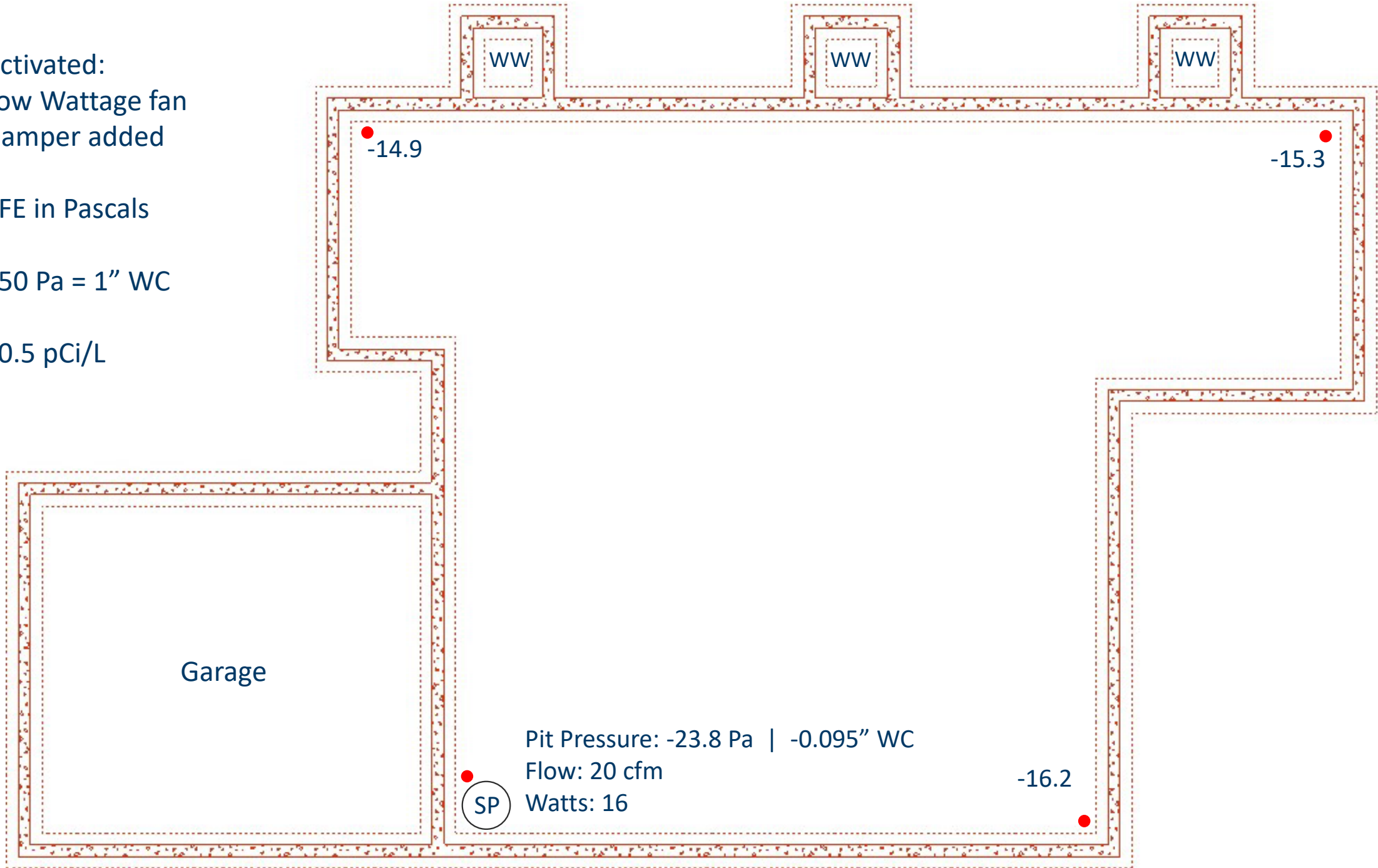


Activated:  
Low Wattage fan  
Damper added

PFE in Pascals

250 Pa = 1" WC

<0.5 pCi/L



# Low Wattage w/ Damper Fan Operating Costs

Air Flow	13	CFM	
Average Annual Heating Degree Days	7500		For MPLS
Average Annual Cooling Degree Days	823		For MPLS
Furnace Efficiency (Gas)	95		
Furnace Efficiency (Electric)		HSPF	
Air Conditioner Efficiency	17	SEER	
Cost of gas	11.5	\$/1000ft <sup>3</sup>	
Cost of Electricity	0.115	\$/KWH	For MPLS
Cost of added Ventilation	\$53	\$/Year	
Fan Wattage	16	Watts	
Cost of Electricity to run Radon Fan	\$16	\$/Year	
<b>Total Annual Operating Cost of Radon System</b>	<b>\$69</b>	<b>\$/Year</b>	

# Additional Attention to Detail can go a Long Way!!

<u>Fan Type</u>	Watts	Airflow CFM from House	Annual Operating Cost	10 Year Operating Cost
Mid-Range	52	45	\$ 236	\$ 2,360
Mid-Range w/ Damper	42	13	\$ 93	\$ 930
Low Wattage	18	20	\$ 100	\$ 1,000
Low Wattage w/ Damper	16	13	\$ 69	\$ 690
Dialed Down Adjustable	2	4	\$ 18	\$ 180

# Thank you.

Joshua Kerber and Chad Robinson

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