ARROWSTREET

LINCOLN-ELIOT ELEMENTARY SCHOOL

SITE PLAN APPROVAL (DRC MEETING)

NEWTON, MA

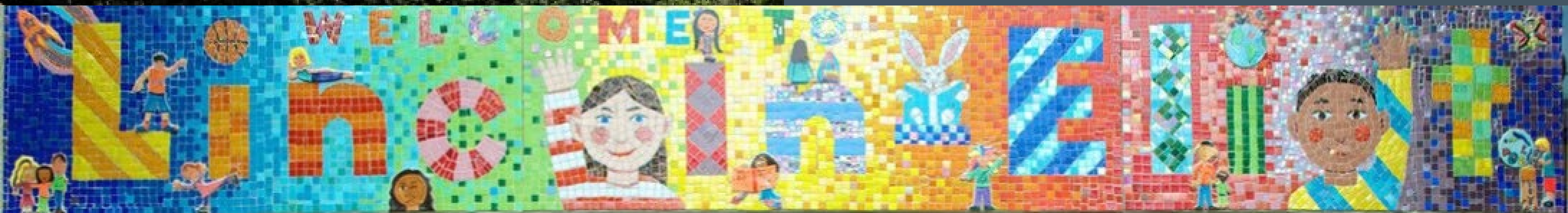
11 MAY 2022

PREPARED FOR

NEWTON PUBLIC SCHOOLS
Equity & Excellence

David Fleishman,
Superintendent

Ruthanne Fuller,
Mayor



AGENDA /

1 SITE ACCESSIBILITY

2 SITE LIGHTING CONCEPT

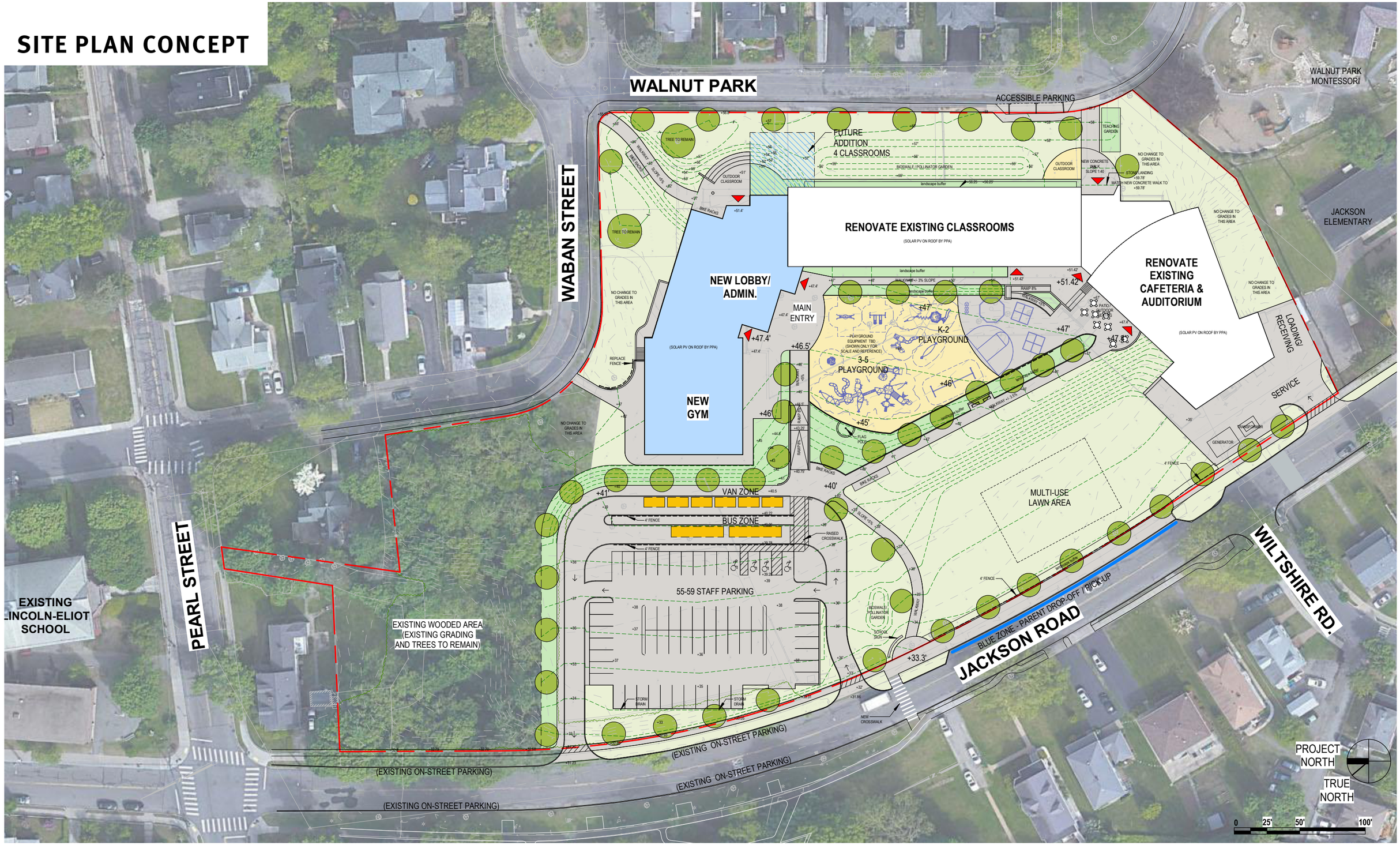
3 ENERGY & LCCA

4 WATER REUSE LCCA

5 EMBODIED CARBON LCA

SITE ACCESSIBILITY

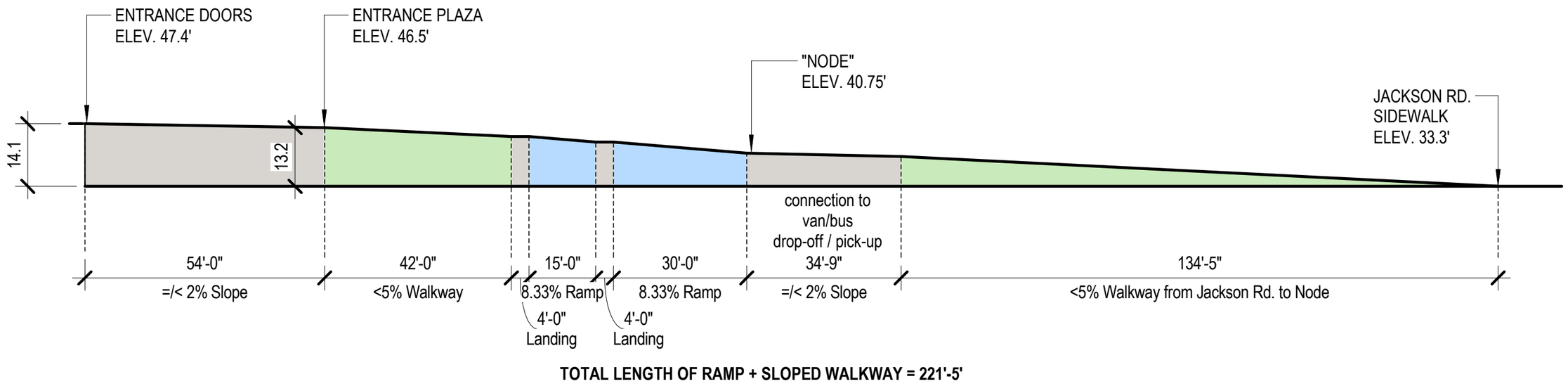
SITE PLAN CONCEPT



ACCESSIBLE ACCESS

WALKWAY / RAMP TO MAIN ENTRANCE

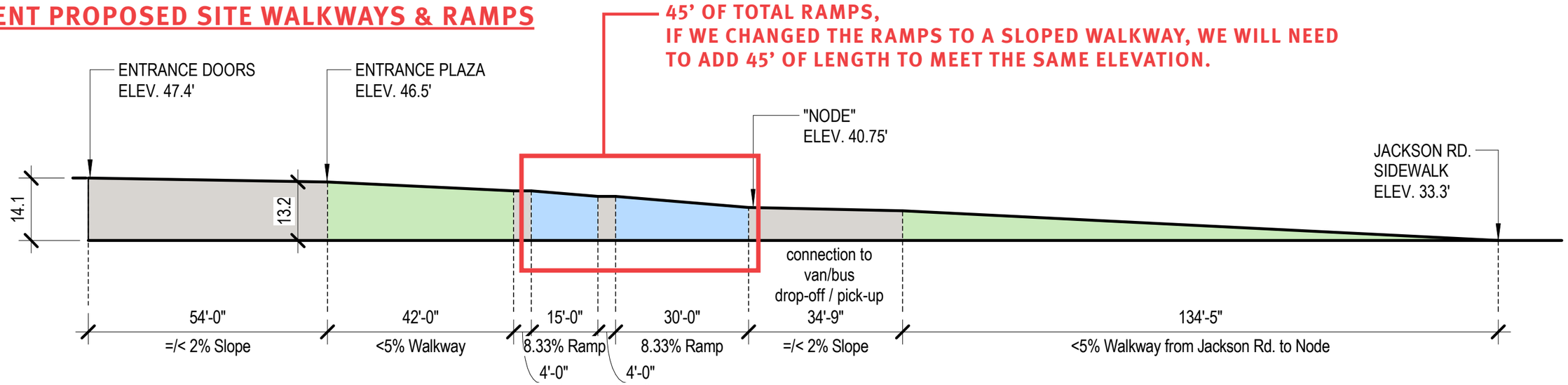
CROSS SECTION OF THE CURRENT PROPOSED SITE WALKWAYS & RAMPS



TOTAL LENGTH OF RAMP + SLOPED WALKWAY = 221'-5'

WALKWAY / RAMP TO MAIN ENTRANCE

CROSS SECTION OF THE CURRENT PROPOSED SITE WALKWAYS & RAMPS



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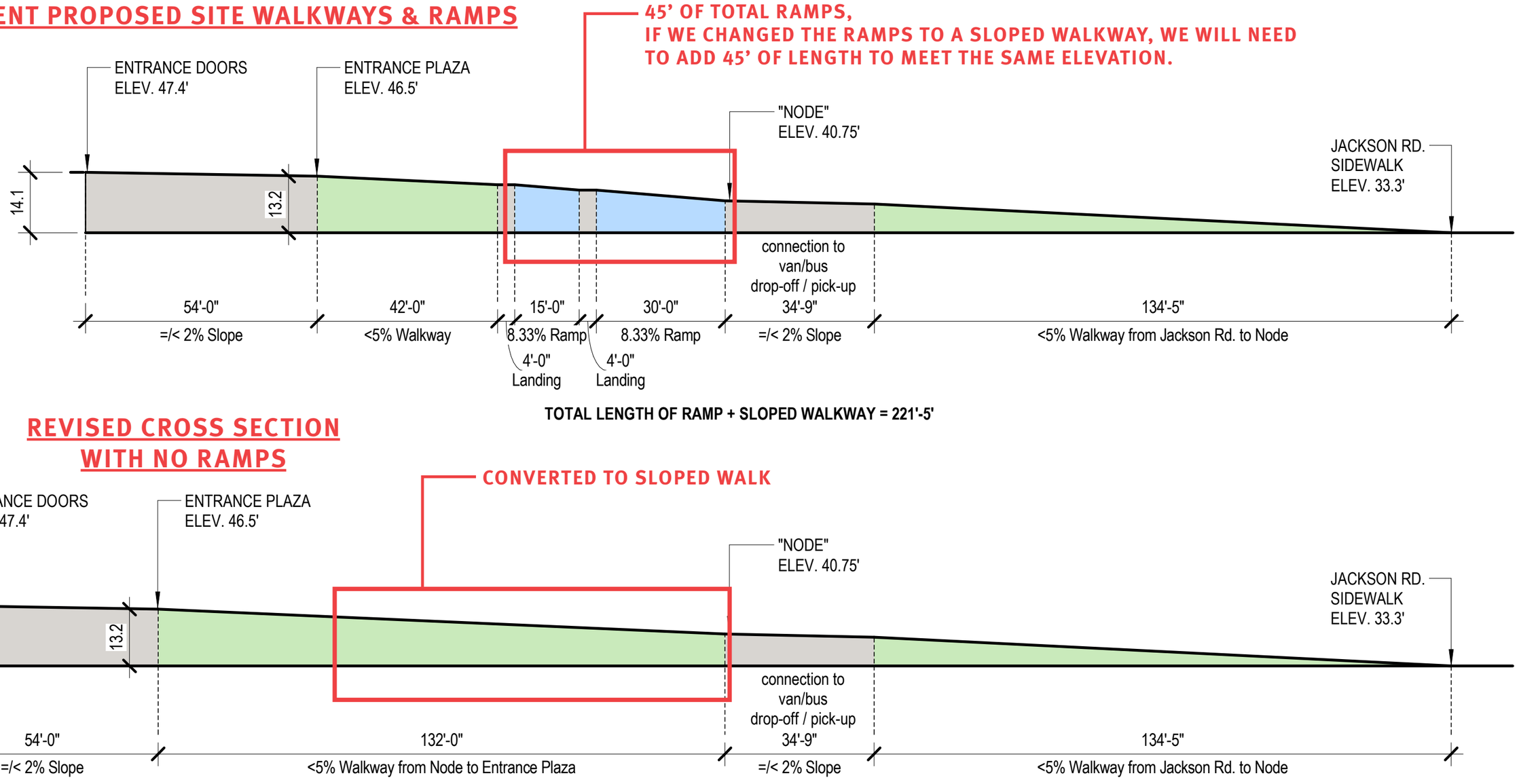


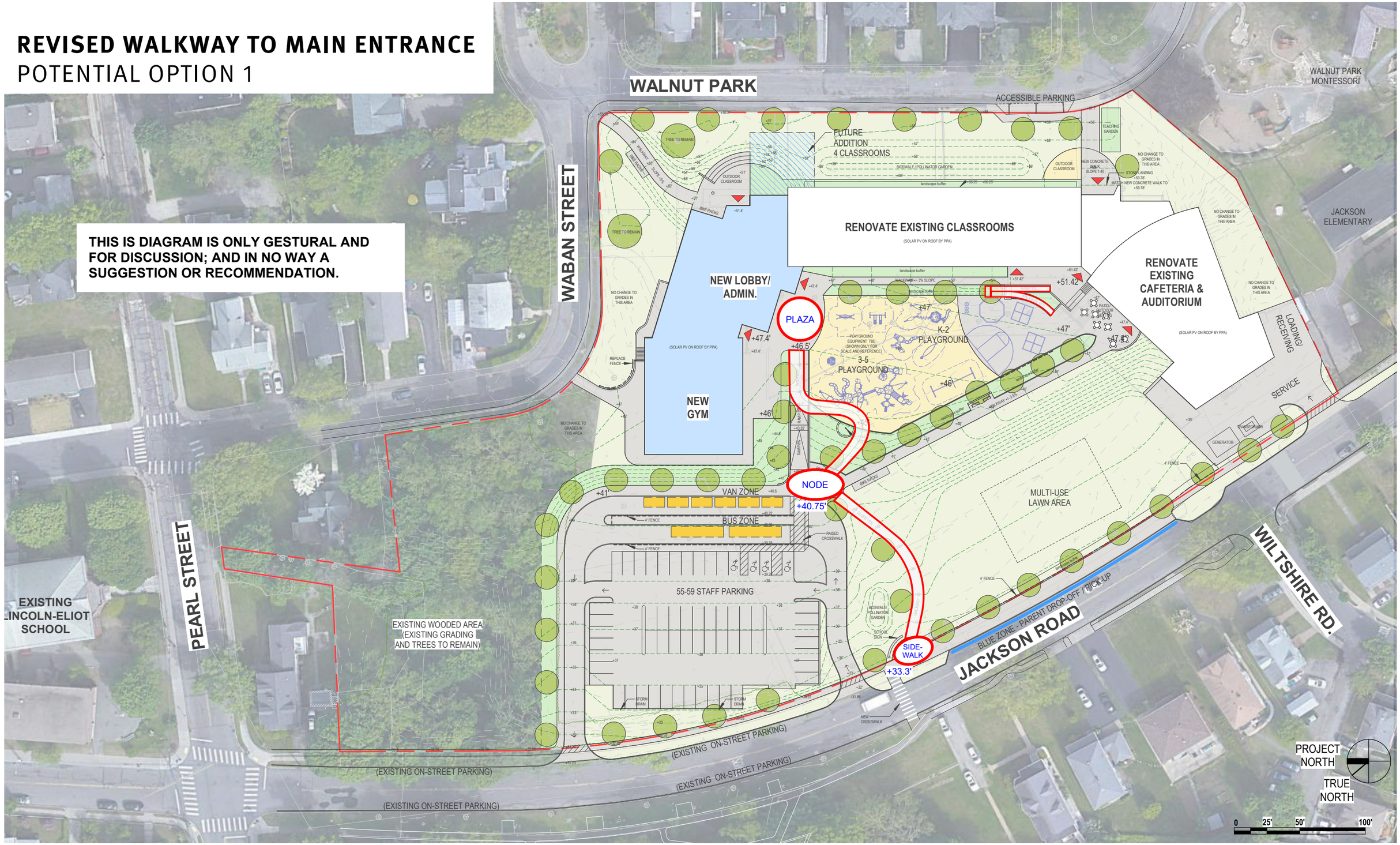
REVISED CROSS SECTION WITH NO RAMPS

TOTAL LENGTH REQUIRED FOR 4.75% SLOPED WALKWAY = 270'-5"

REVISED WALKWAY TO MAIN ENTRANCE

POTENTIAL OPTION 1

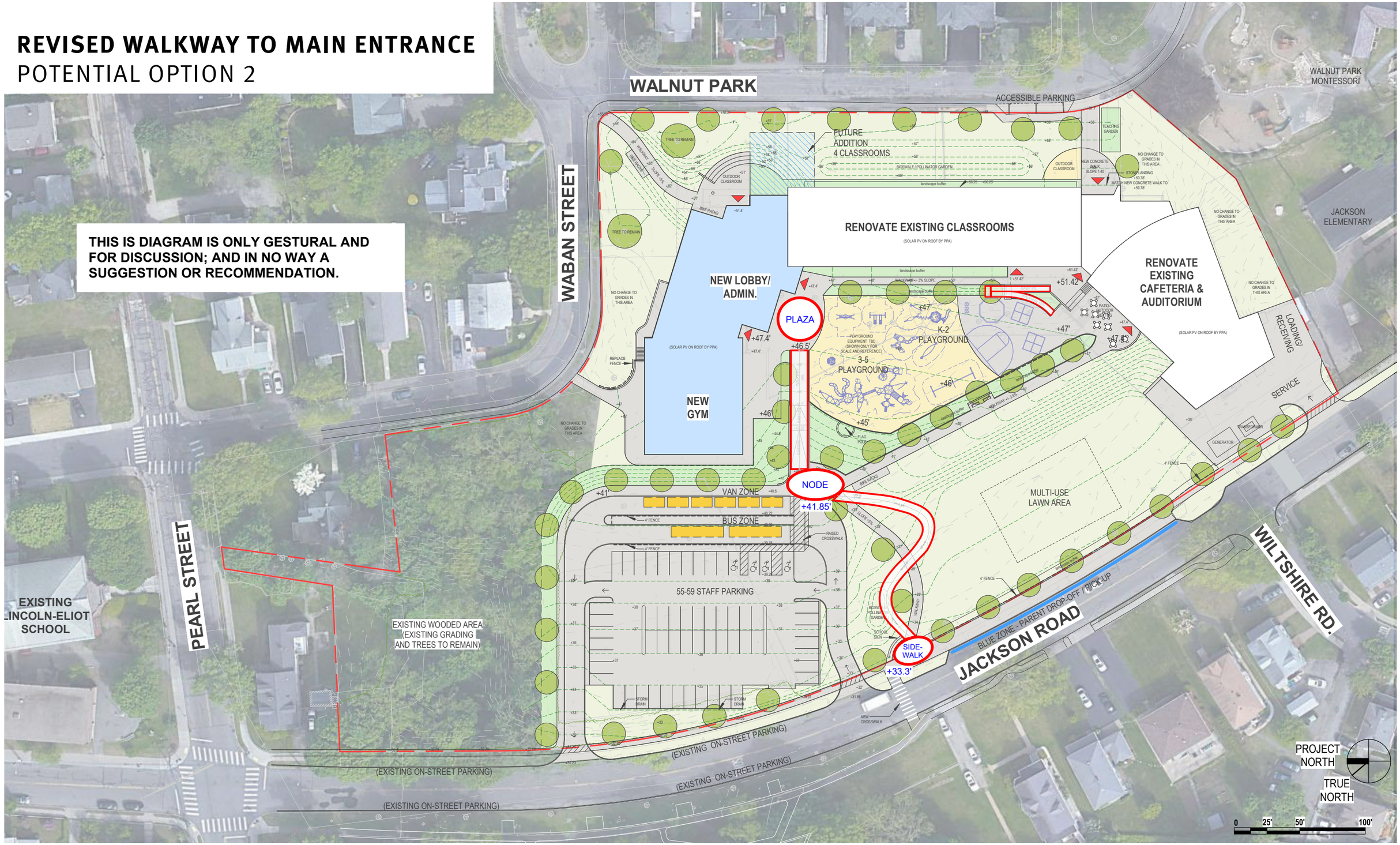
THIS IS DIAGRAM IS ONLY GESTURAL AND FOR DISCUSSION; AND IN NO WAY A SUGGESTION OR RECOMMENDATION.



REVISED WALKWAY TO MAIN ENTRANCE

POTENTIAL OPTION 2

THIS IS DIAGRAM IS ONLY GESTURAL AND FOR DISCUSSION; AND IN NO WAY A SUGGESTION OR RECOMMENDATION.



SITE LIGHTING CONCEPT

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LIGHTING DESIGN:

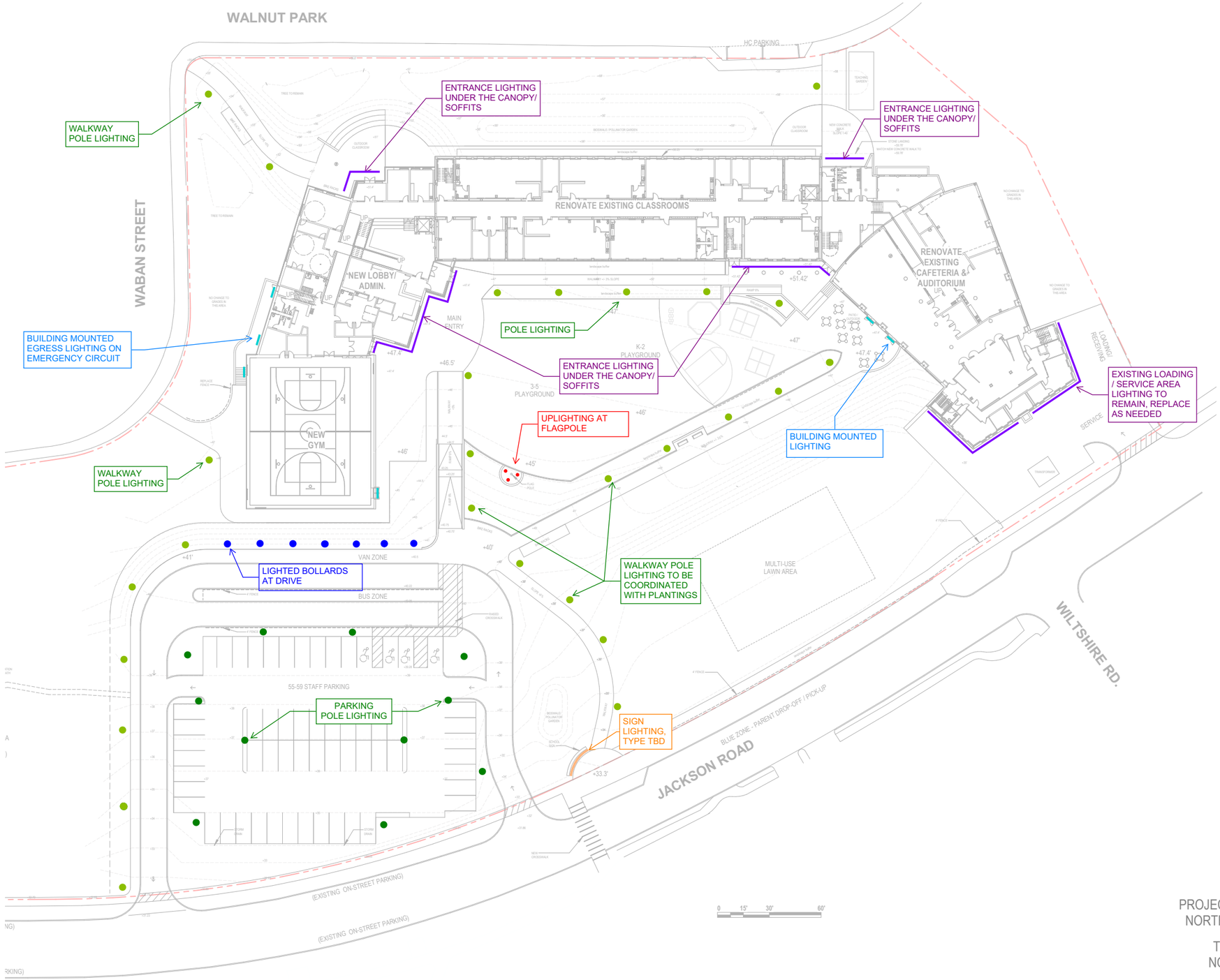
- OPTIMIZE ENERGY PERFORMANCE
- LED FIXTURES
- LIGHTING CONTROL
- DARK SKY COMPLIANT
- MEET LIGHTING BOUNDARIES
- PHOTOMETRICS WILL BE PROVIDED

WALKWAY POLE LIGHTING

PARKING POLE LIGHTING

LIT BOLLARD

WALL MOUNTED BUILDING LIGHT



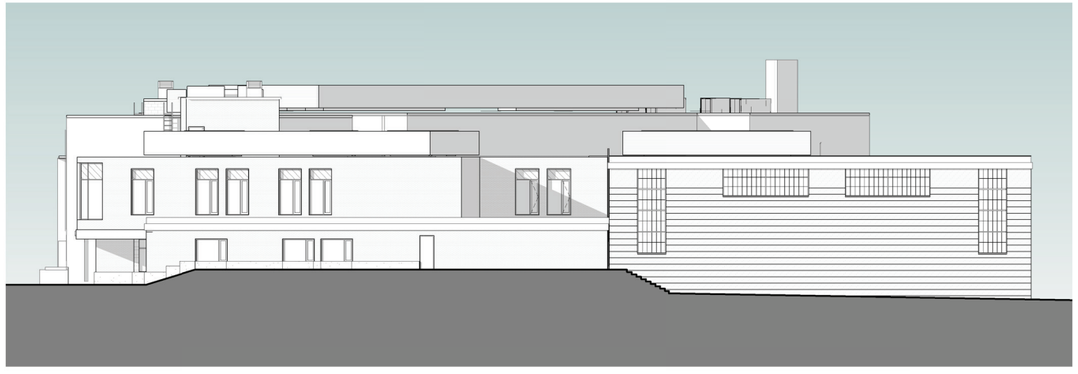
BUILDING EXTERIOR ELEVATIONS

BUILDING EXTERIOR ELEVATIONS

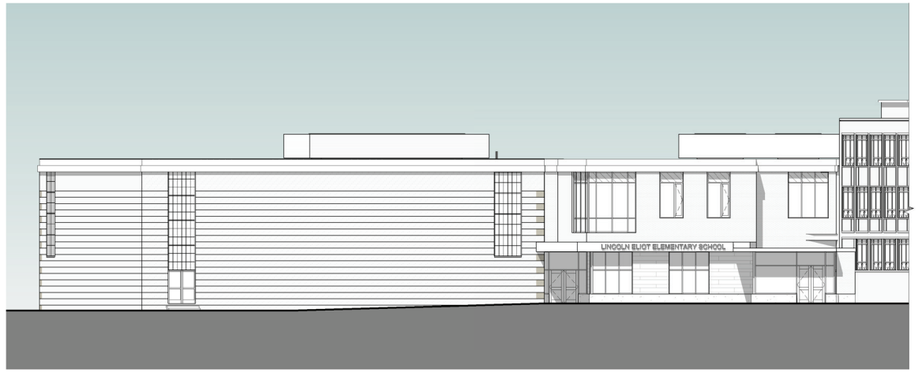
EXTERIOR ELEVATION - WEST (TRUE)

EXTERIOR ELEVATION - EAST (TRUE)

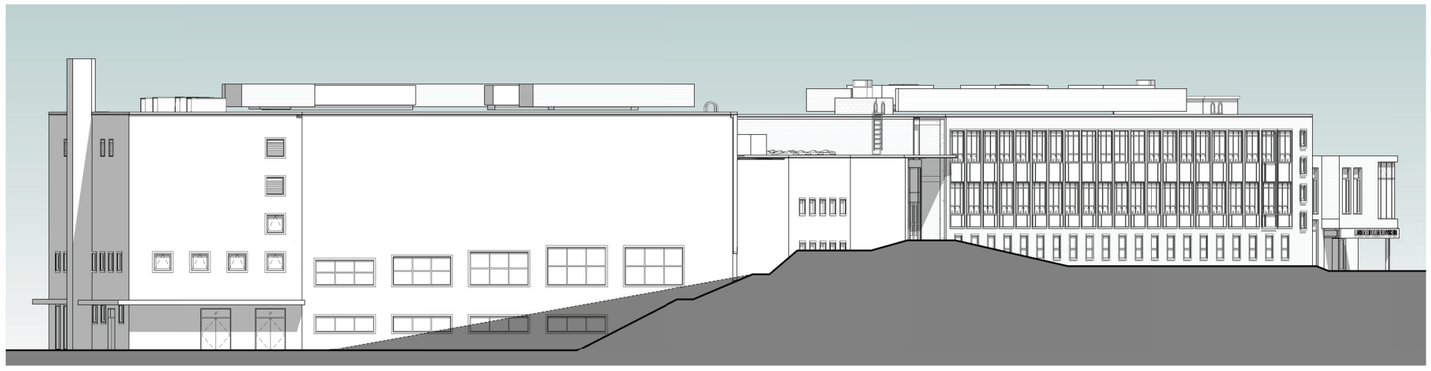
BUILDING EXTERIOR ELEVATIONS



EXTERIOR ELEVATION - NORTH (TRUE)



EXTERIOR ELEVATION - NEW ADDITION - SOUTH (TRUE)



EXTERIOR ELEVATION - SOUTH (TRUE)

ENERGY & LCCA FINDINGS

HVAC SYSTEM OPTIONS

ALL-ELECTRIC

#1

VRF

Overhead Ventilation

ALL-ELECTRIC

#2

Air Cooled Heat Pump Chiller & Electric Boiler

Displacement Ventilation

ALL-ELECTRIC

#3

Ground Source Heat Pump

Displacement Ventilation

HVAC SYSTEM OPTIONS
QUALITATIVE COMPARISON

		EUI	Carbon Emissions	Indoor Air Quality	Acoustics	Annual Energy Cost	Annual Maintenance Cost	Annual Savings	Capital Investment Cost	Lifetime Savings	Discounted Payback	Eversource Incentive
#1	VRF	◌	◌	○	○	◌	○	◌	●			◌
#2	Air Cooled Heat Pump Chiller & Electric Boiler	○	○	●	●	○	●	○	●	○	●	◌
#3	Ground Source Heat Pump	●	●	●	●	●	●	●	◌	●	◌	●

Scale

● ○ ◌

Better ⟷ Worse

WATER REUSE LCCA
FINDINGS

WATER REUSE FOR IRRIGATION LCCA

Water Demand

	gallons	Pecent Reduced by Reuse
Flushing Demand	748250	0%
Cooling Tower Demand	0	0%
Irrigation Demand	278671	95%

Water Reuse Capital Cost

Reuse Design	Estimated Cost	No Reuse Design	Estimated Cost
Rainwater reuse system (25,000gal tank)	$330,197	Min required stormwater retention system	$0
Reuse piping to WC/urinals	$0	Potable only piping	$0
Reuse piping to cooling tower	$0		
Reuse piping to irrigation			
TOTAL	**$330,197**	TOTAL	**$0**

DELTA **$330,197**

Water Reuse Payback

Payback Period Calulation - Septic		Payback Period Calulation - Sewer	
Estimated demand savings in gallon/year	264,737	Estimated demand savings in gallon/year	264,737
Current water cost per gallon	-	Current water cost per gallon	$0.0136
Estimated annual water cost	n/a	Estimated annual water cost	$3,600.43
		Current sewer cost per gallon*	$0.00
		Estimated annual sewer cost	$0.00
Annual O&M Cost		Annual O&M Cost	
Payback period in years	**n/a**	**Payback period in years**	**92**

Notes: Assumes a separate water meter for irrigation, which will not incur sewer rates and will be billed as water only

EMBODIED CARBON LCA
FINDINGS

WHAT IS EMBODIED CARBON

Image: EC3

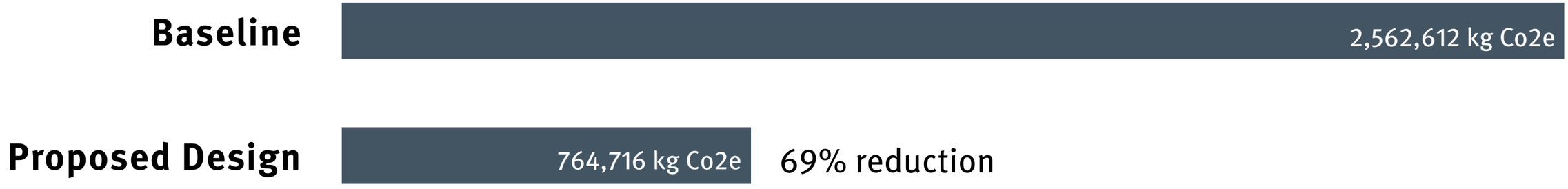
METRIC: GLOBAL WARMING POTENTIAL (GWP)

UNITS: $kgCO_2e$

TOOL: LIFE CYCLE ASSESSMENT

e = equivalence which means all greenhouse gases (CO2, CH4, N2O, HFCs, PFCs, SF6, NF3)

LIFE CYCLE ASSESSMENT
RESULTS - EMBODIED CARBON



BASELINE
- **Typical new construction components instead of reuse**

PROPOSED DESIGN
- **Reused majority of existing structure and facade**

LOW CARBON DESIGN ELEMENTS
(SAME IN BASELINE & PROPOSED)

- **Brick cladding on addition**
- **20% SCM concrete mix**
- **Mineral wool insulation above grade**
- **Low carbon CMU (TBD)**
- **Low carbon drywall (TBD)**
- **Exposed ceiling in library**

Q&A

For Further Information:

- www.newtonma.gov/gov/building/capital_projects
- www.lincolneliot-necp-projects.com
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- Vivian Varbedian, Project Manager, Hill International; vvarbedian@hillintll.com