

A Presentation For:



**WARRIOR RUN
SCHOOL DISTRICT**
Excellence in Education

By Principals:
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October 28th 2014

2014

Exterior Wall Forensic Study
Warrior Run School



Brick Study Completed on High School

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Carney Engineering Group
10/16/2014

mortar of the brick veneer and CMU joints (see Figure 1). There is an air gap, measuring roughly one inch, between the brick veneer and CMU backup. No waterproofing or insulation was noted in this wall type.

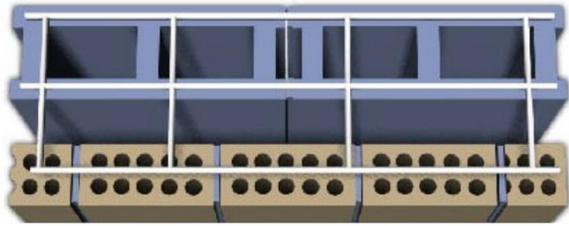


Figure 1: Wall Type 1- Ladder Type Wire Reinforcement

Wall Type 2:

Wall Type 2 consists of brick veneer with a light gage steel stud backup system. The brick veneer is tied to the light gage steel backup with a corrugated wall tie (see Figure 2) that is embedded in the brick mortar and attached to the steel stud with a nail. There is about a one inch air gap along with 3/4" thick homasote sheathing in between. No waterproofing or insulation was noted in this wall type.

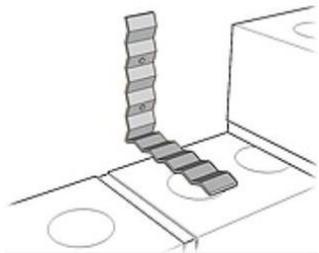


Figure 2: Wall Type 2- Corrugated Wall Tie

Wall Type 3:

Wall Type 3 consists of brick veneer with a poured concrete backup. The brick veneer is tied to the poured concrete backup with a dovetail tie. This particular tie is embedded in the brick mortar joint and connected to a track that is fixed to the poured concrete backup (see Figure 3). No waterproofing or insulation was noted in this wall type.

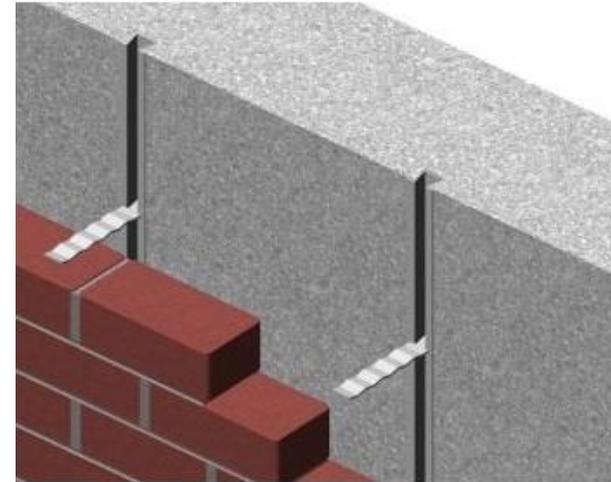


Figure 3: Wall Type 3- Dovetail Wall Tie

South Wall

- Inclined cracking at several locations (see example in Figure 4).
- One full height control joint (see Figure 4).

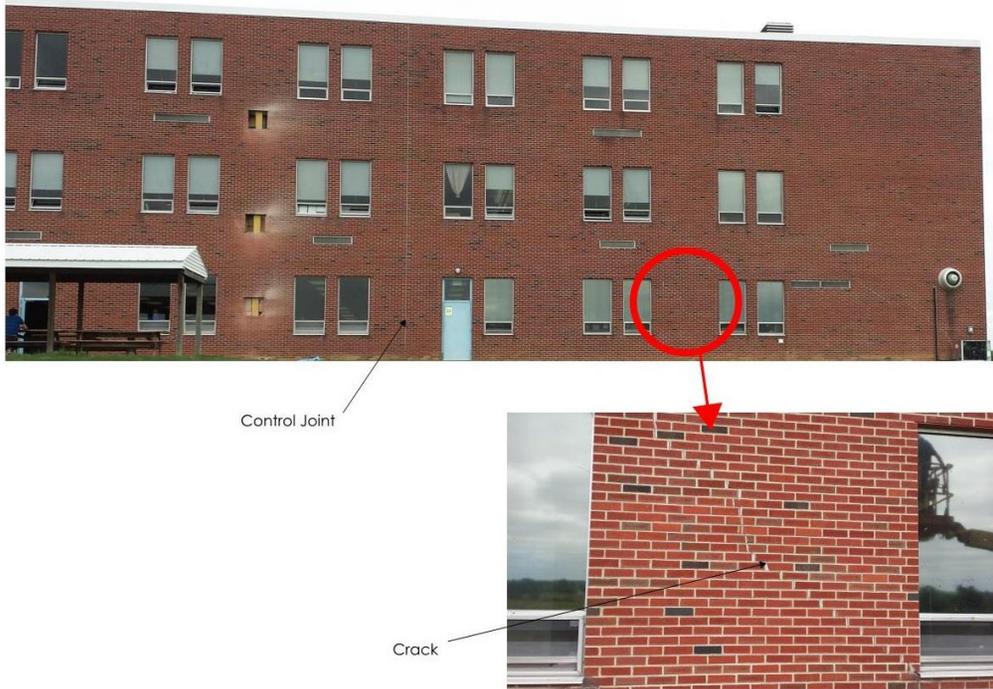


Figure 4: South Wall

South Wall, First Floor:

- Wall Type 1
- The ladder joint reinforcement wire has surface corrosion (see Figures 5 and 6).



Figure 5: South Wall, First Floor Ladder Type Wire Joint Reinforcement

Surface Corrosion



Figure 6: South Wall, First Floor Ladder Type Wire Joint Reinforcement Section

Appendix IV

Additional Photos



Wall Type 1



Failed Corrugated Wall Tie



Corroded Joint Reinforcement



Brick with Corroded Joint Reinforcement



Wall Type 2



Corroded Corrugated Wall Ties

South Wall, Second Floor:

- Wall Type 2
- The brick ties are spaced at 16" O.C. vertically and 24" O.C. horizontally.
- The brick ties show moderate corrosion in the portion of the tie embedded in the brick mortar joints (see Figure 7).



Figure 7: South Wall, Second Floor Corrugated Wall Tie

South Wall, Third Floor:

- Wall Type 2
- The brick ties are spaced at 16" O.C. vertically and 24" O.C. horizontally.
- The brick ties show extensive corrosion. The portion of the tie embedded in the brick mortar joint is corroded through (see Figure 8).



Figure 8: South Wall, Third Floor Corrugated Wall Tie

Gymnasium East Wall- Low:

- Wall Type 3
- No control joints were noted.
- The dovetail wall tie shows extensive corrosion. The portion of the tie embedded in the brick mortar joint is corroded through (see Figure 9).



Figure 9: East Gymnasium Wall, Dovetail Wall Tie Corrosion

Gymnasium East Wall- High:

- Wall Type 1
- There are no control joints.
- The ladder joint reinforcement system shows extensive corrosion. The wire is corroded through in one observed location (see Figures 10 and 11).
- The wall is bowing out in several locations.



Figure 10: East Gymnasium, Ladder Type Wire Joint Reinforcement



Figure 11: East Gymnasium Wall, Ladder Type Wire Joint Reinforcement Corrosion

East Gymnasium Wall Recommendation:

To remedy the problem of the failed mortar joints and bowing wall we suggest removing the current wire reinforcing and mortar joints (every sixth course of brick) and replace the ties with a Helifix wall tie (see Figure 13) and to repoint the horizontal joints. This will serve to provide more secure and durable veneer attachments as well as limiting opportunity for further wall deterioration from corroding wires. We do not suggest trying to shift the wall back, and instead recommend monitoring the bowing of the wall over time by installing movement gauges. We do feel at this time that the amount of movement is structurally unsafe, and believe it will not move further once repaired. Helifix ties would be installed at a 16" x 24" grid spacing over the full extent of the exterior gymnasium walls.



Figure 13: Helifix Wall Tie

Appendix II

Brick Veneer Anchoring System

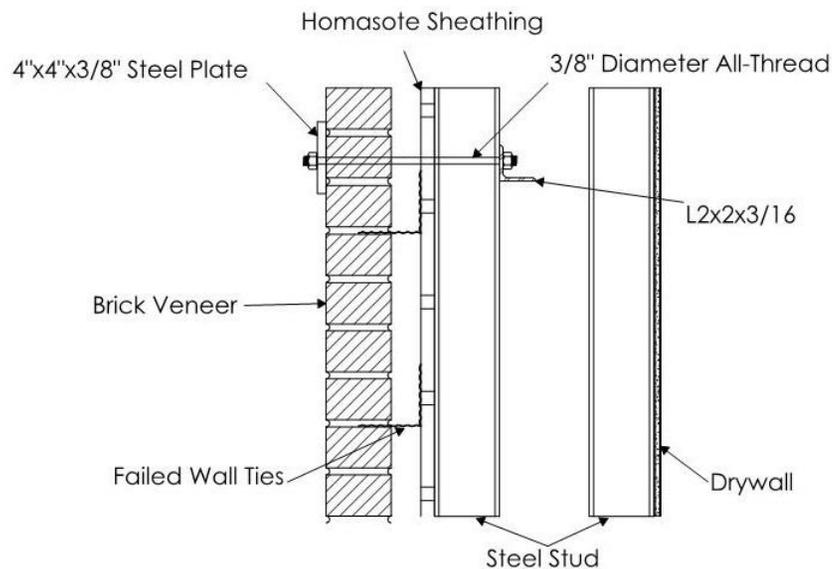
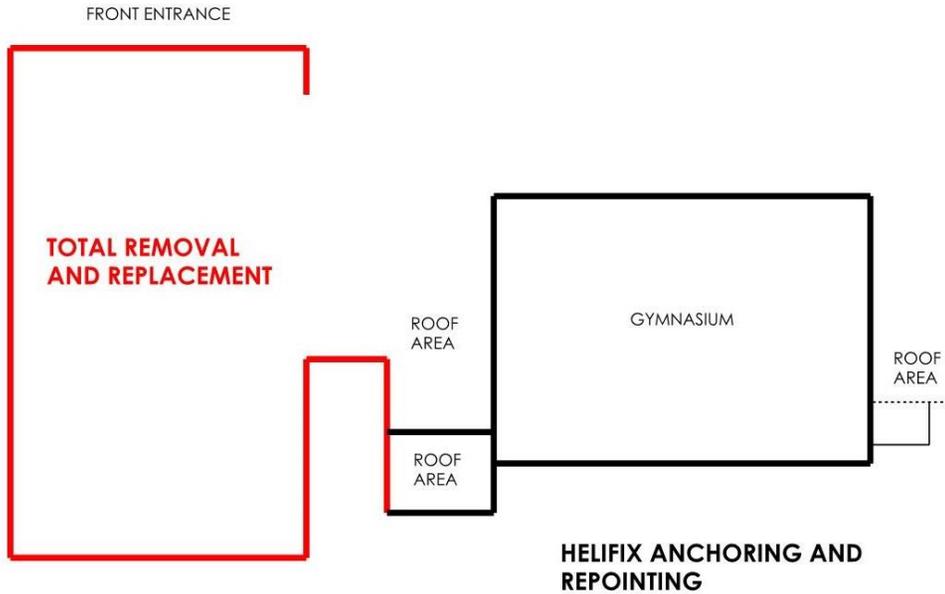


Figure 12: Typical Anchor Layout
(Note: Other walls similar)

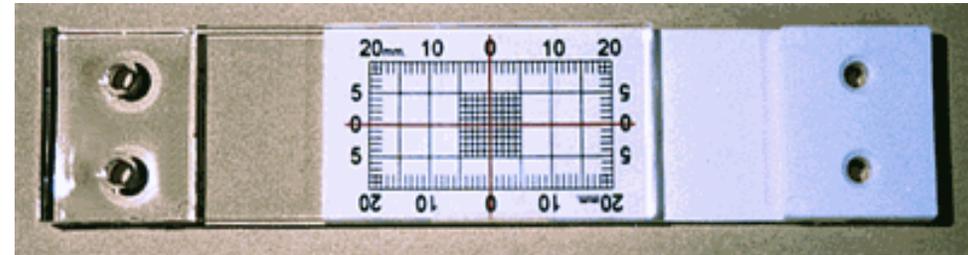
West, East, and South Walls Long-Term Recommendation:

In the long term, and to ensure a reasonable life cycle for the building, it is our opinion that the veneer and backup light gage framing will need to be completely removed and a new backup, drainage, insulation, and veneer system be installed. Once the brick veneer is removed, the wall system will be required to meet current building codes. This will include widening the wall to include insulation and a larger cavity behind the veneer. To achieve this, the foundation will need to have brick shelf added to accommodate the wider wall above. It is also likely that new structural steel may be required at larger openings such as the front entrance to accommodate the increase in wall width. It should be noted that the primary gravity load bearing system of columns, girders, and joists was noted to be in excellent condition, with no significant evidence of deterioration.

Appendix III
Warrior Run High School



Appendix I
Crack Monitor



Avongard Crack Monitor

The Avongard Crack Monitor consists of two overlapping acrylic plates. One plate is white with a black millimeter grid, while the other is transparent with red crosshairs centered over the grid. Once the Crack Monitor is in position across a crack, the crosshairs shift vertically or horizontally on the grid if movement occurs. This allows for quantitative tracking of crack movement over time. Ordering information, further details, and installation instructions can be found at www.avongard.com.

V. BUDGETARY COST ESTIMATE

Items included in total estimate: (Reference Appendix III)

Total Removal and Replacement

1. Removal of existing brick veneer, homasote sheathing, and steel studs
2. Installation of steel studs
3. Foundation widening
4. Installation of insulation and air vapor barrier
5. Installation of new brick veneer
6. Structural steel as required

Helifix Anchoring & Repointing

1. Remove existing wire reinforcing
2. Cut out mortar joints and repoint
3. Install Helifix anchors
4. Remove and replace damaged and cracked brick veneer units
5. Install additional control joints and install sealants
6. Cut out and recaulk existing control joints

**Interior finishes, windows, HVAC units, and casework are not included in this estimate and are understood to be accounted for by other consultants. We also recommend that a construction contingency be carried on these budget numbers until such time as the final design has been fully developed.

Total long term work Budgetary Estimate (prevailing wage) = \$1,950,000 (2014 Dollars)

Total estimate for short term monitoring and safety fixes = Approx. \$30-40,000

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ELEMENTARY PROGRAMMING - NEW CAMPUS FACILITY

Student CAP	servings	seated	CAFETERIA	10-12sf/seated	KITCHEN	3-4 sq/served
600	2	300	3000	3600	1800	2400
	3	200	2000	2400		
	4	150	1500	1800		
av class size	22					
Pre K	1	22	800	800		
Head Start	1	22	800	800		
K garten	6	132	800	4,800		
1st grade	6	132	800	4,800		
2nd grade	5	110	800	4,000		
3rd grade	5	110	800	4,000		
4th grade	5	110	800	4,000		
TOTAL	29	594		23,200		
		low	high			
SE > 660	3	660	1,200	2,100	toilets	bidet
SE < 660	3	150	450	1,350		
SE safe rm	1	150	200	120		
faculty room	1	400	800	800		
Art	1	900	1,200	900		
Music	1	900	1,400	1,400		
Library	1	1,800	2,500	3,000		
Computer	1	660	1,000	0		
Admin	1	500	1,000	1,000		
Guidance	1	300	500	500		
Nurse	1	800	1,200	1,000		
conference	1	300	450	350		
Kitchen	1	1,800	2,400	1,800		
cafeteria	1	1,500	3,600	3,600	1/2 & 1/2 Multi-purpose	
Gymnasium	1	1,200	8,500	3,600		
					sf/stu	PDE cap
subtotal				44,720	58	771
cir/toilets/st			1.58	70,658	25,938	
						

90% Draft - NOT FINAL

■ RENOVATION
■ ADDITION

TOTAL RENOVATION
- 16,276 sq ft
TOTAL ADDITION
- 18,563 sq ft

29 classrooms
@22/st/class=
638 capacity
current 582

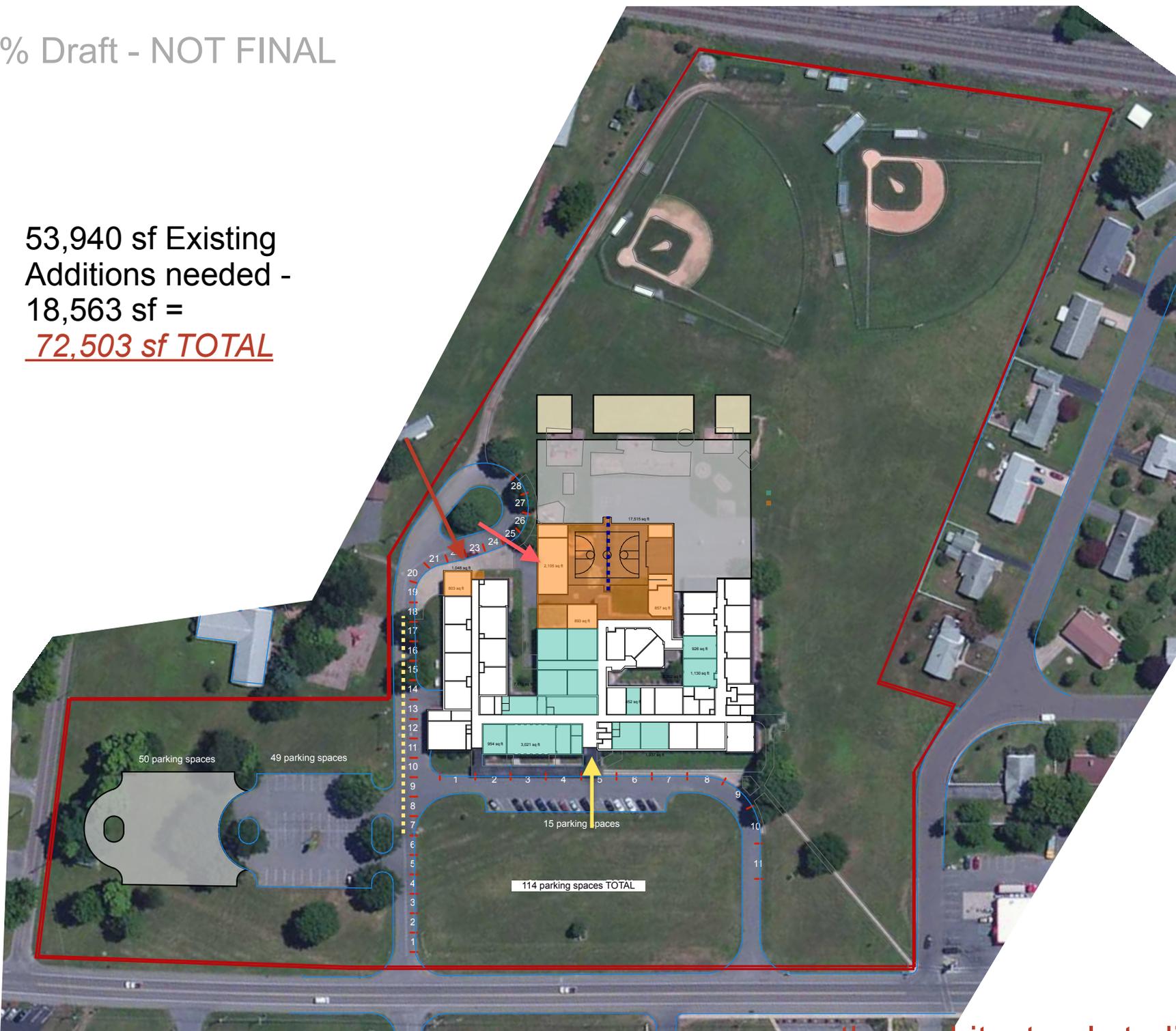
53,940 sf Existing
Additions needed -
18,563 sf =
72,503 sf TOTAL



Pre K - 1 (20 students)
Head Start - 1 (20 students)
K - 6 (20 students)
1st - 6 (20 students)
2nd - 5 (20 students)
3rd - 5 (25 students)
4th - 5 (25 students)
29 TOTAL CLASSROOMS
630 TOTAL STUDENTS

90% Draft - NOT FINAL

53,940 sf Existing
Additions needed -
18,563 sf =
72,503 sf TOTAL



PROJECT SCOPE

- New heat and AC entire building
- Toilet Fixture Replacements
- Not Full Renovations
- Exterior Windows/ Brick to remain
- Repairs done on any exterior wall deterioration
- Painting and sink fixture upgrades in rooms
- Ceiling tiles replaced per HVAC changes only
- Added parking for additional teachers/ staff
- New drop off loop reconfigured
- Re-locate any playground fixtures
- Repave/replace hard surface play areas
- Kitchen equipment all new
- furniture in new portions only

	Large additions to house program, larger gym, music and several classrooms				
	Programmatic building as described in Elementary Programming sheet				
CURRENT SF	53,940				
Students	611				
	sf	cost/sf	TOTAL		
additions	18,563	\$200	\$215	\$3,712,600	\$3,991,045
Major renovations	16,276	\$200	\$215	\$3,255,200	\$3,499,340
Minor Renovations	0	\$175	\$180	\$0	\$0
mechanical systems				\$1,500,000	\$1,600,000
kitchen equipment				\$350,000	\$450,000
brick repairs				\$100,000	\$120,000
temp facilities				0	\$0
site improv.		allowance		\$900,000	\$1,200,000
sub total				\$9,817,800	\$10,860,385
+ soft cost		20%		\$1,963,560	\$2,172,077
TOTAL				\$11,781,360	\$13,032,462
					-10%
TOTAL SF	72,503				
	<i>* soft cost- permits, fees, furniture, loose equipment, engineering and design fees, financing costs, contingency allowance and project management costs all included.</i>				
	119 sf/student				



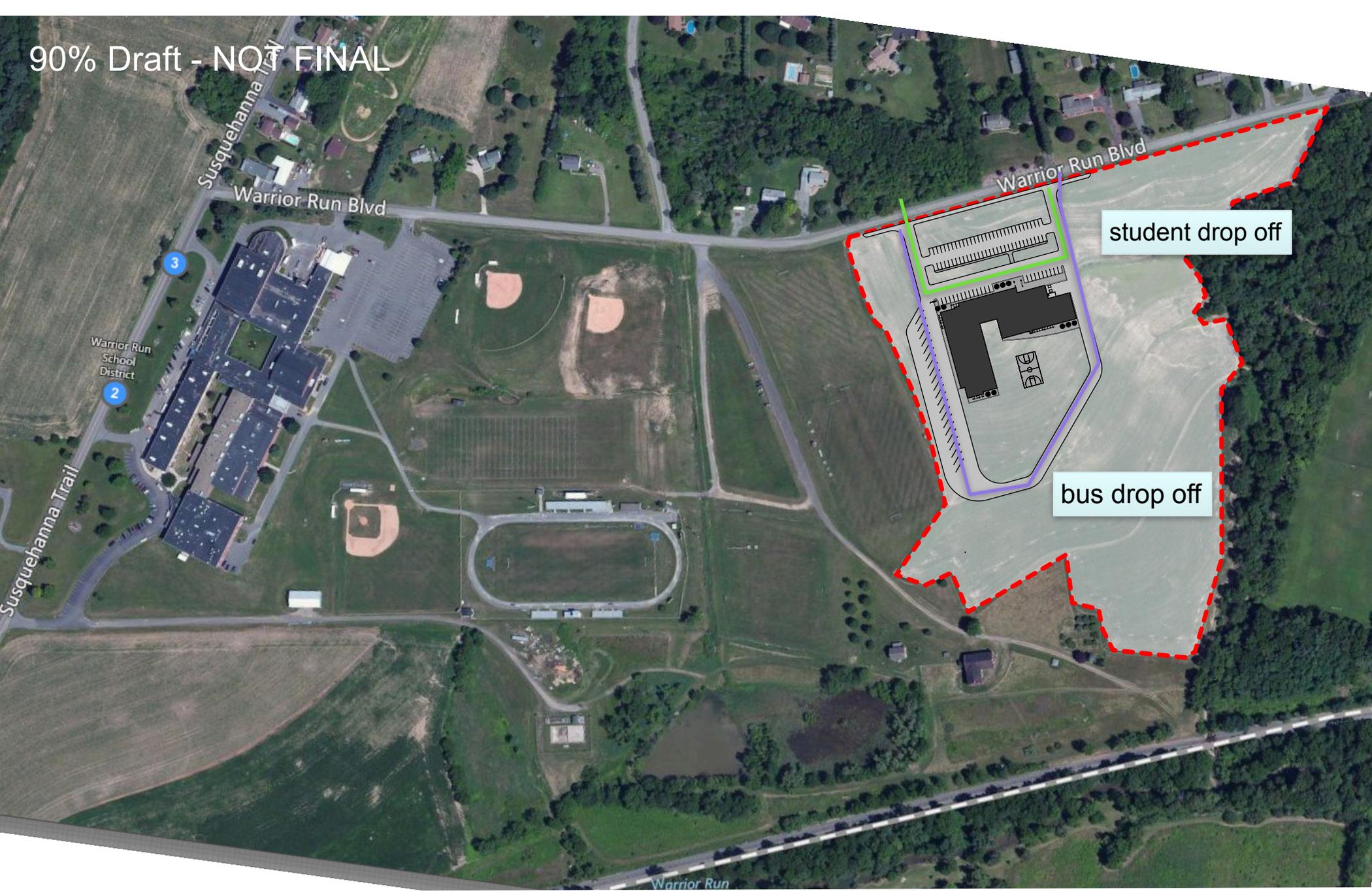
PROJECT SCOPE

- New heat and AC entire building
- All Toilet rooms completely renovated to new
- Full Renovations to all areas
- All new systems, alarms, bells clocks & technology
- Exterior Windows replaced
- Brick repaired & Replaced
- Painting and sink fixture upgrades in rooms
- New Ceilings & lighting
- Money to replace/repair roofs
- Added parking for additional teachers/ staff
- New drop off loop reconfigured
- Re-locate any playground fixtures
- Repave/replace hard surface play areas
- Kitchen equipment all new
- new furniture through out
- THOROUGH RENOVATION

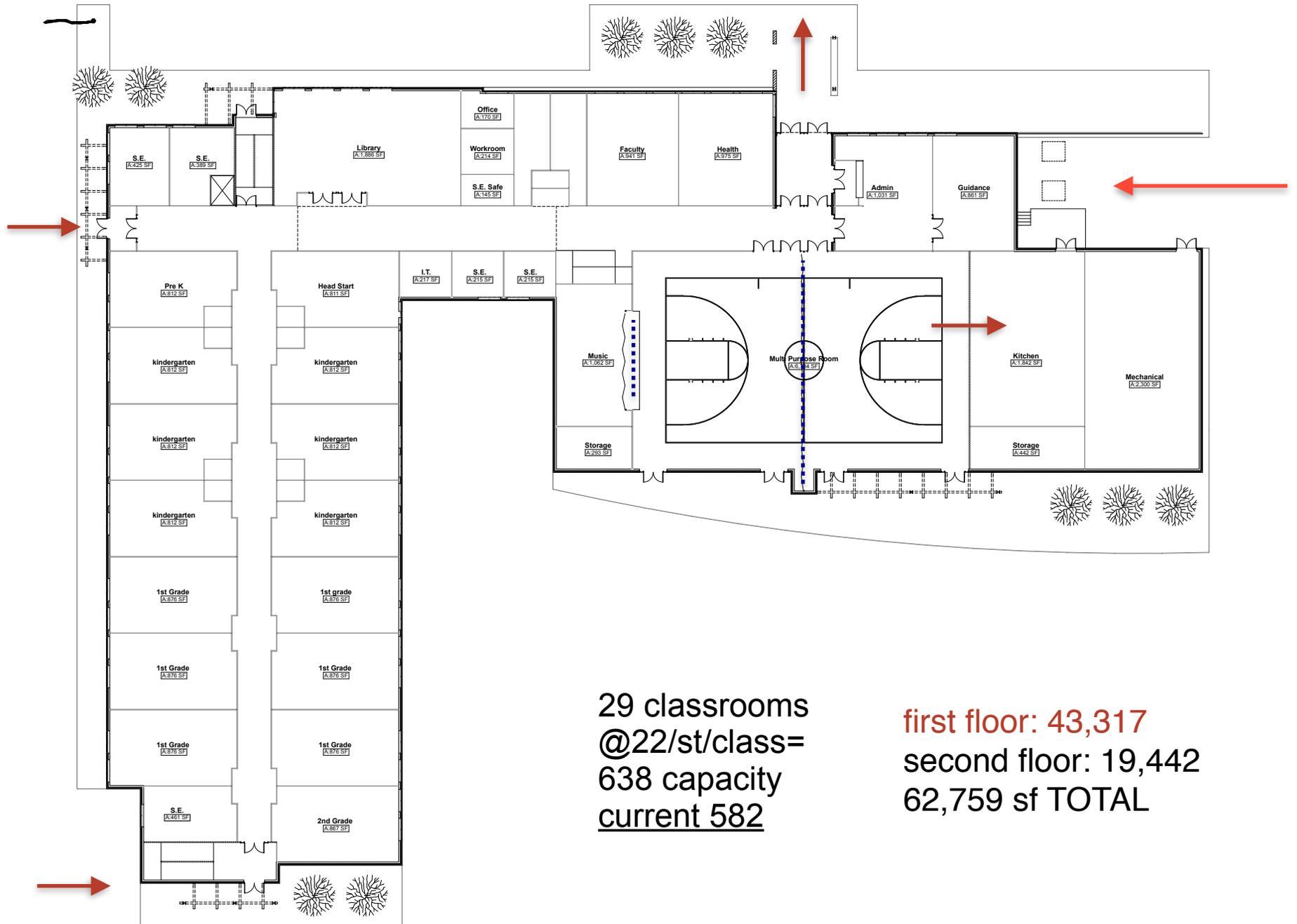
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	Programmatic building as described in Elementary Programming sheet				
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	sf	cost/sf	TOTAL		
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Major renovations	16,276	\$200	\$215	\$3,255,200	\$3,499,340
Minor Renovations	37,664	\$175	\$180	\$6,591,200	\$6,779,520
mechanical systems				\$1,500,000	\$1,600,000
kitchen equipment				\$350,000	\$450,000
brick repairs				\$100,000	\$120,000
temp facilities				0	\$0
site improv.		allowance		\$900,000	\$1,200,000
sub total				\$16,409,000	\$17,639,905
+ soft cost		20%		\$3,281,800	\$3,527,981
TOTAL				\$19,690,800	\$21,167,886
					-7%
TOTAL SF	72,503				
	<i>* soft cost- permits, fees, furniture, loose equipment, engineering and design fees, financing costs, contingency allowance and project management costs all included.</i>				
	119 sf/student				



90% Draft - NOT FINAL

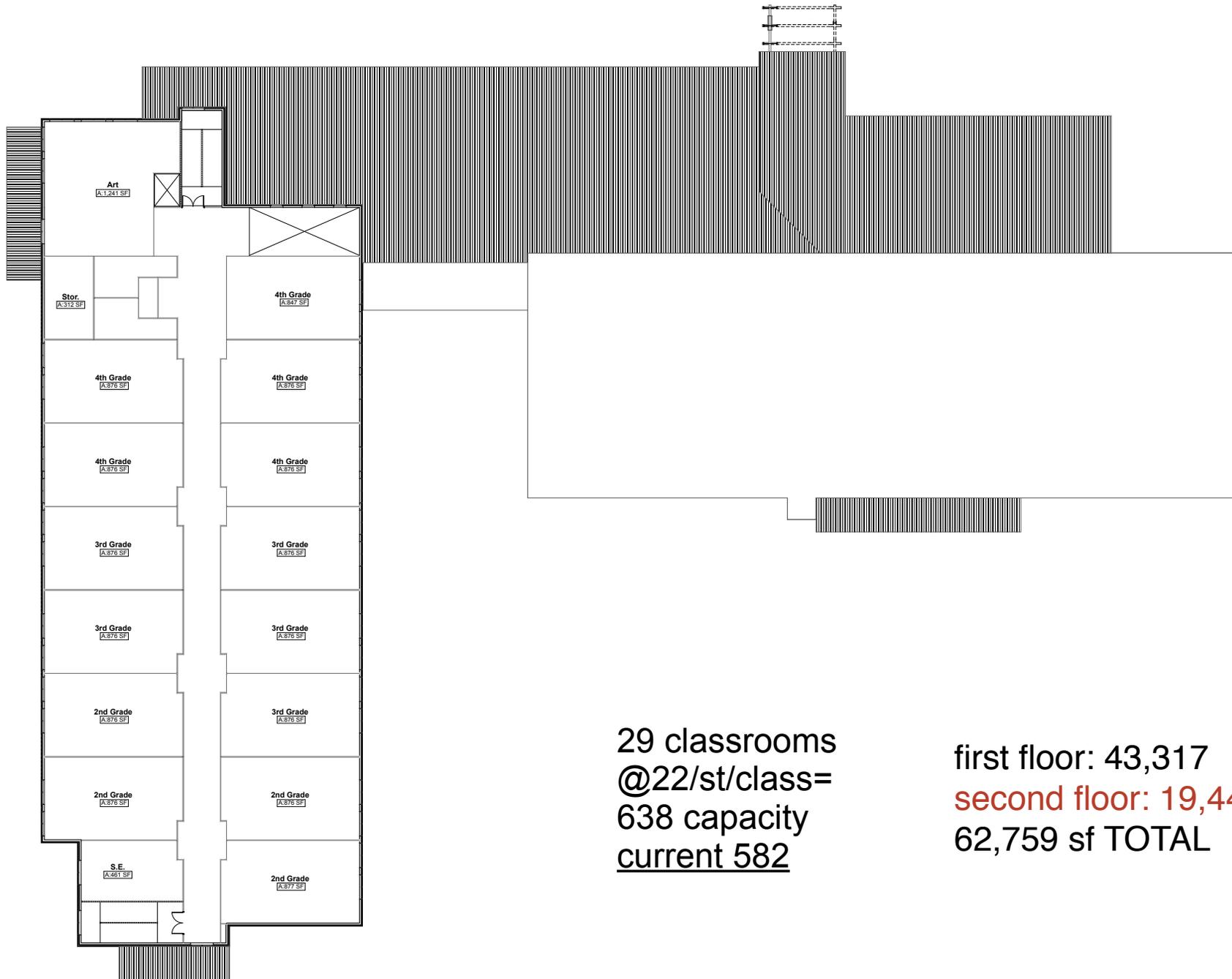


OPTION # 3 WRE at Campus site



29 classrooms
@22/st/class=
638 capacity
current 582

first floor: 43,317
second floor: 19,442
62,759 sf TOTAL



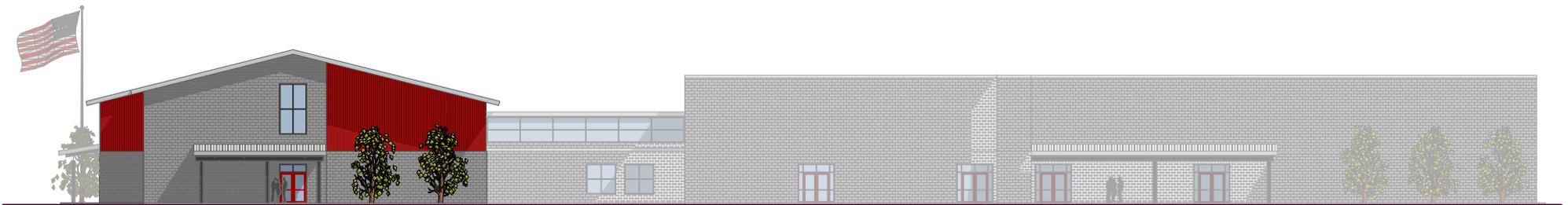
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638 capacity
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62,759 sf TOTAL

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COST SAVINGS OF CONSOLIDATION 2 ELEMENTARY'S TO 1-

Option- 1C Minor

Energy savings- \$28,436
w rate reduction-\$58,738
Busing Savings- \$0*
Staffing Savings- \$724,000

TOTAL - \$758,755- \$782,738

Option- 1C Major

Energy savings- \$37,793
w rate reduction-\$73,783
Busing Savings- \$0*
Staffing Savings- \$724,000

TOTAL - \$761,793- \$797,783

Option- Option 3

Energy savings- \$79,531
Busing Savings- \$10,000*
Staffing Savings- \$724,000

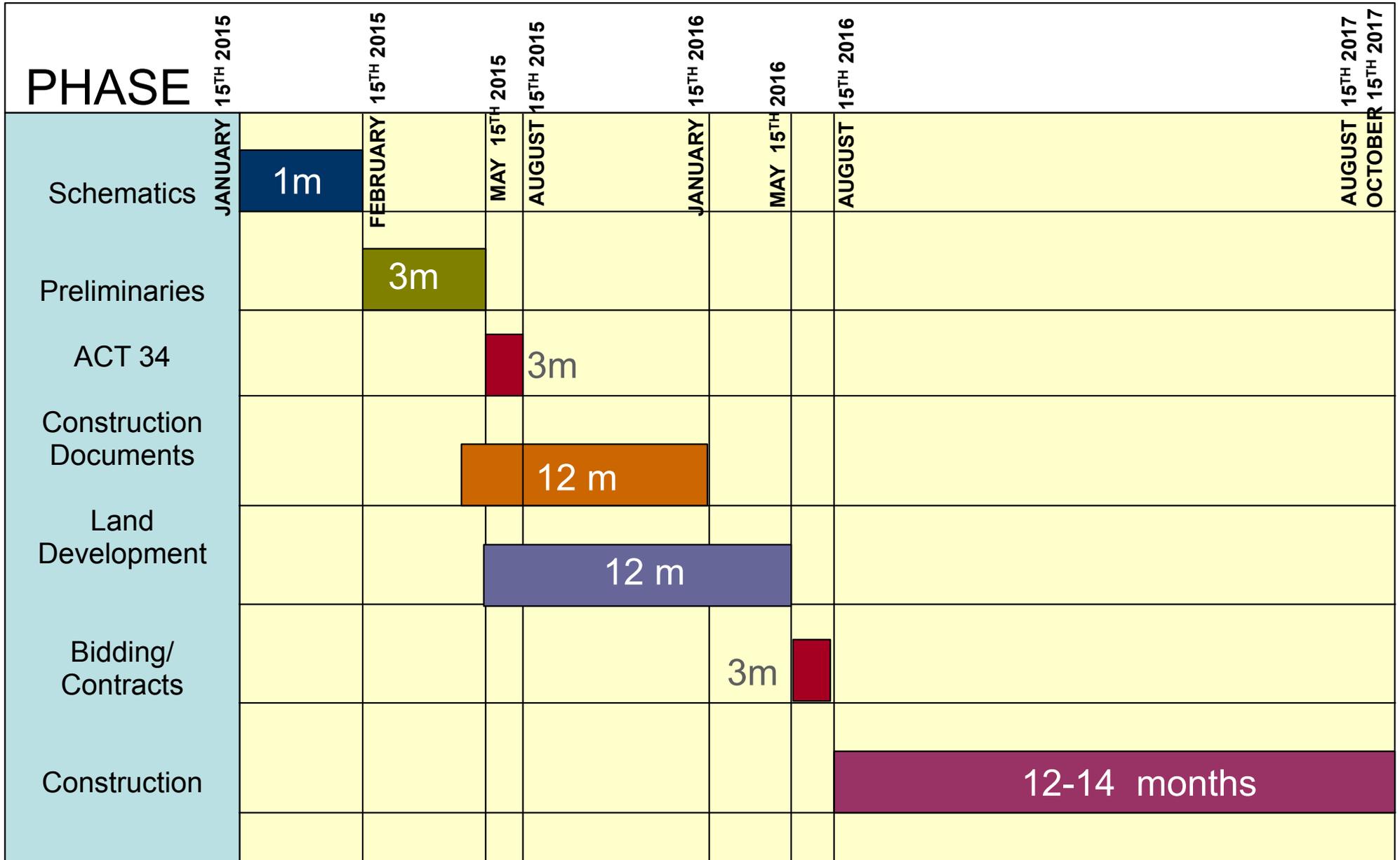
TOTAL - \$813,531

potential \$51,738 - \$15,748 yr. difference between 1C & 3
(additional annual cost for energy)

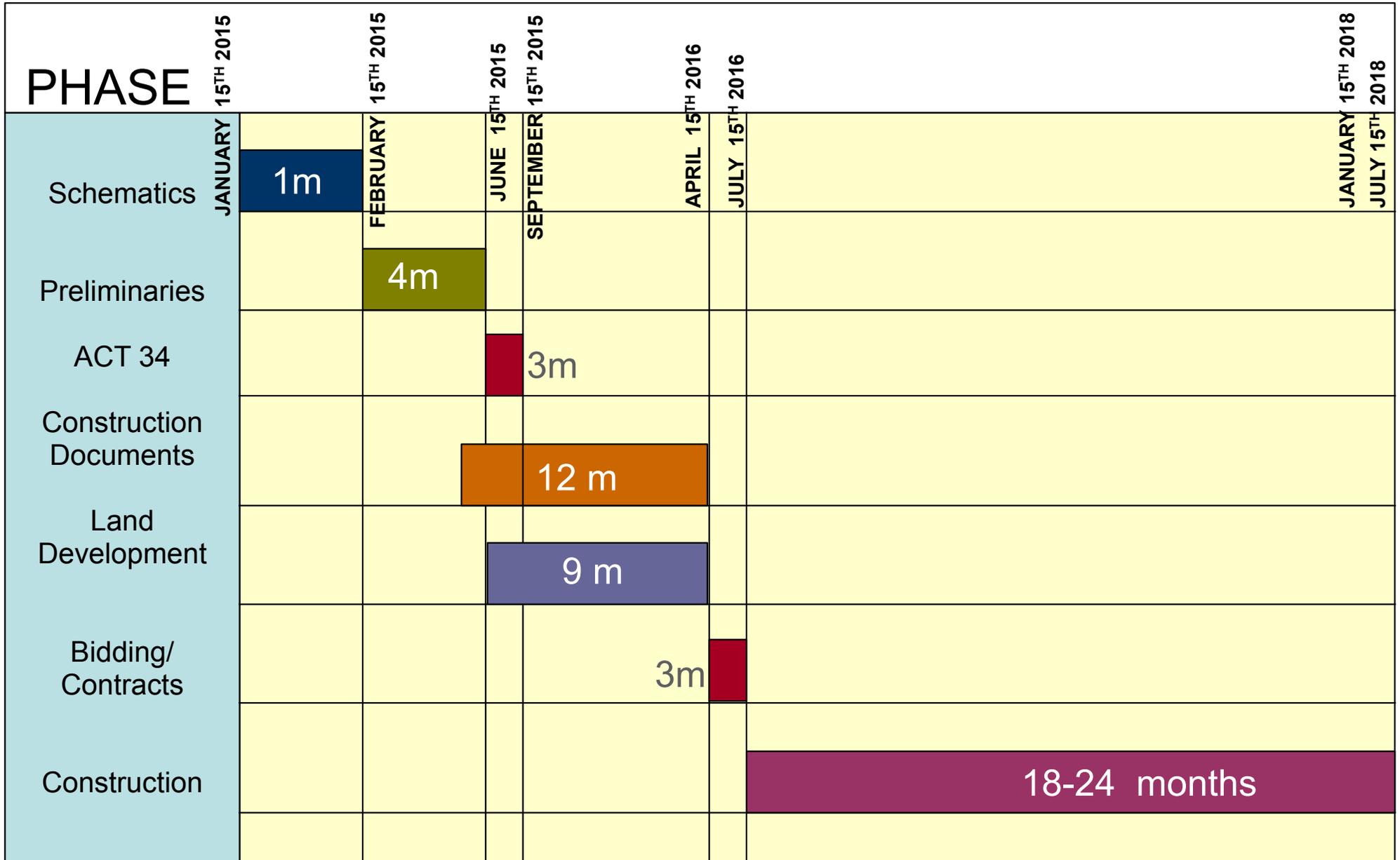
- energy savings shows w & wo elec. rate change with borough
- all energy cost include Air Conditioning

- * estimate- data still being analyzed- conservative figures
- * If adjustments in start times Option 3 could yield more savings
- * fine tune of hourly rates of each driver vrs. drive time reduction
- * potential increased ride times for options 1C maj/min for Turbotville elem. students
- * potential slightly decreased ride times for option 3 for all elementary students

Project Timeline - new construction



Project Timeline - renovation



Summary of Elementary Options:

OPTION #1C MINOR Warrior run elementary at Watsonstown location, ideal class sizes adding substantial additions to include large gym space - *11.7 to 13 million*

OPTION #1C MAJOR Warrior run elementary at Watsonstown location, concentrated class sizes adding minor additions to include all programs - *19.6 to 21.1 million*

OPTION #3 @ 62,759 SF shown - renderings & plans shown
New Warrior Run Elementary at Campus location- facility + site development - *18.1 to 20.1 million*

OPTION #3 @ 70,659 SF (NO GRAPHIC IMAGE)
New Warrior Run Elementary at Campus location- facility + site development - *19.8 to 21.9 million*

WATSONTOWN RENO ONLY Renovations to dated areas, exterior and interior repairs, new mechanical systems ONLY. No additions or program expansion. *2.8 to 3.8 million*

Question & Comment Period