ARCHITECTS GWWO

MEETING NOTES
Design Development Meeting 03 (DD 03)

Project:
FCPS – ES Prototype: Waverley ES (WAVES)
GWWO Project #18045

Meeting Date: May 30, 2019
Report Date: June 17, 2019

In Attendance:

Name	Initials	Organization	Email
Brian Staiger	BS	FCPS	Brian.staiger@fcps.org
Brad Ahalt	BA	FCPS	Bradley.ahalt@fcps.org
Curtis Orndorff	CO	FCPS	Curtis.orndorff@fcps.org
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MaryJo Richmond	MR	FCPS	maryjo.richmond@fcps.org
Zaira Martinez	ZM	ECS	zmartinez@ecslimited.com
Keith Nelson	KN	ECS	knelson@ecslimited.com
Steve Krell	SK	Oak Contracting	skrell@oakcontracting.com
Jason Hearn	JH	GWWO	jhearn@gwwoinc.com
Scott Moir	SM	GWWO	smoir@gwwoinc.com
Jess Dancer	JD	GWWO	jdancer@gwwoinc.com

The purpose of this meeting was to discuss working floor plan updates, introduce the working façade scheme and review various exterior envelope options for feedback from ECS Limited, the FCPS-contracted envelope commissioning consultant.

- BS and DT requested an update on the civil/site plan development. JH confirmed ADTEK had the information needed to press forward. An update will be provided during or before the next design meeting.

- JH reviewed the working floor plans and noted the emphasis of the discussion will be on the classroom wings of the building. The central node is still under development.

- JH provided some three-dimensional snapshots of the classroom wing façades. As shown, the building consists of brick masonry veneer and a rainscreen metal panel system. Aluminum storefront and curtain wall glazing exists throughout.

  - JH offered three potential options for wall construction: cold-formed metal stud framing, CMU block and precast concrete. The design team endeavors to offer three potential options with limited modifications to detailing.

  - KN questioned the extent of the day's discussion. JH confirmed that emphasis would be placed on envelope components with limited focus on transitions and continuity.

  - Option 1: Cold-formed Metal Framing

    1. KN expressed no concerns with the proposed foundation condition.

    2. JH outlined cavity and continuous insulation requirements outlined by the 2015 IECC (energy code).

    3. KN expressed reservations about mounting a 3"/R-13 batt within a 6" stud cavity and closed-cell spray foam as a continuous air barrier. R-13 batts are approximately 3" and tend to sag within a 6" stud cavity. Closed-cell spray foam tends to separate from components as buildings move. JH agreed and stated that a single outboard layer of continuous insulation may be better suited. KN recommended using a 3" layer of mineral wool, as it is also non-combustible. DT noted that mineral wool is a significant increase in cost.

    4. If closed-cell spray foam is used, KN recommended a dedicated WRB (water-resistive barrier) in a fluid application. Board insulation (extruded polystyrene, polyisocyanurate and/or mineral wool) can be installed over a sheet applied WRB.

    5. A continuous insulation cap to wrap the parapet will need to be further explored by GWWO and ECS.

  - Option 2: CMU Block

    1. KN expressed no concerns with the proposed foundation condition but did question why the CMU block did not terminate at the second floor. JH explained that, as shown, the block wall would bear its dead load to the foundation with the second-floor structure acting as lateral support. Extending the second-floor slab outward and bearing the upper level block courses on it would incur heavy dead load on the second-floor structure and result in increased steel sizes.

    2. KN expressed the same concerns with closed-cell spray foam as mentioned previously. A continuous, fluid applied WRB is recommended in this condition as well.

  - Option 3: Precast Concrete

1. JH displayed photographs of finished precast panels with embedded brick and form-lined treatment.

2. CO and BA reiterated their concerns with precast concrete, primarily repair in the event a vehicle was to strike the wall. KN noted that the wall would likely fair better than the vehicle.

3. KN noted that coordination between the precast manufacturer and those on-site would be required to ensure no air or water gaps at the slab-on-grade transition point; JH agreed.

4. JH emphasized the potential scheduling advantages or fabricating panels off-site. However, did note that current precast lead times can be up to one (1) calendar year. DT questioned whether work would have to stop during fabrication. JH explained that separate bid packages would be required. SM and BS noted significant lead times may not be feasible due to the way funds are released.

5. BA questioned the construction efficiency of precast mainly in terms of interior wall finish. JH noted that interior furring and drywall would most likely be needed. BA saw this as double work. JH understood the concern but also noted that the interior face of precast could be painted or sealed. Coordination of outlet locations would be required.

6. JH summarized the discussion by noting that schedule, durability, maintenance, cost (both up-front and life cycle), and incremental funding restrictions would ultimately inform the final decision. BS emphasized the importance of having options and studying them early.

7. DT and SK agreed to price out the three approaches after review of the 75% Design Development submission.

- JH presented the current DD design schedule.

The foregoing represents the writer's interpretations of what transpired at the meeting. Please forward any changes or corrections within five (5) days to jhearn@gwwoinc.com. Otherwise these notes will stand as the final record of the meeting.

Respectfully submitted,
GWWO, Inc./Architects

Jason T. Hearn, AIA, LEED AP BD+C
Project Manager

Attachments: Keith Nelson e-mail, dated June 3, 2019

CC: All Attendees
Tammie Smith
Kathy Prichard
Paul Hume

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Jason Hearn

From: Keith P Nelson <KNelson@ecslimited.com>
Sent: Monday, June 3, 2019 1:04 PM
To: Staiger,Brian M; Scott Moir; Jason Hearn; Prichard,Kathy; Lebo,Paul; Mamoon,Adnan; Richmond,MaryJo; Nelson,Holly Rebecca; Pasierb,Elizabeth (Beth); Wilkinson,Robert E; Orndorff,Curtis; Gue,Richard A; Cordes,Amy Lynn; Dave Toth; Davenport, J. David; Tony Kukowski (akukowski@oakcontracting.com); Myers,Debra B; Concepcion,Michelle A; Smith,Tammie S; Gloria Mikolajczyk (Gloria.Mikolajczyk@maryland.gov); Zaira Elizabeth Martinez
Cc: Tribit,Zelda E; Ford,Wanda J; Eric Baumgartner; Paul Hume; Eric Feiss; Admin
Subject: RE: Waverley ES Design Meetings

Waverley and FCPS Team,

Thank you the opportunity to meet with the group last Thursday to discuss the early stage building envelope performance at Waverley and the related designs. The notes and recommendations below cover several items discussed in the meeting as well as concepts we did not get to. These items are provided for consideration and discussion based on our understanding of the project to date.

Notes and Recommendations:

Wall Assembly -

1. **Provide a Dedicated WRB** – We understand that FCPS has built and is building many facilities with closed-cell spray polyurethane foam (ccSPF) generally on CMU back up to serve as the primary air, water, thermal, and vapor control layers for the exterior wall assembly with mixed results. Based on our project experience with these assemblies especially when subjected to performance testing, ECS highly recommends the use of a dedicated air and water resistive barrier (WRB) in addition to the thermal control layer (insulation/ccSPF). If we continue with ccSPF insulation with a dedicated air and WRB ECS further recommends the use of a fluid applied air and WRB, such as (in no particular order) Henry AB17/31/33MR, Tyvek FA, Prosoco R-Guard CAT 5, Momentive SilShield 2600, DefendAir 200, or many others. Considering other insulation types, XPS, Polyiso, Mineral wool would allow consideration of sheet applied (fully adhered or mechanically fastened) air and WRBs. This decision also plays into the combustibility discussion below.
2. **Reduce Wall Assembly Combustibility** – Although building code likely does not require compliance with vertical and lateral flame propagation requirements with the building less than 40 feet in height, ECS recommends consideration be given to reduce the combustibility of the exterior wall assembly mitigate the risk and impact of fire and other extreme events. This can be accomplished by moving to a dedicated air and WRB (discussed above) and incorporating a non-combustible insulation (mineral wool) in the cladding cavity. Additional consideration may be given to reduce the combustibility of the air and WRB by selecting a WRB that meets the exception #2 requirements in 2015 IBC section 1403.5, including Momentive SilShield 2600, DefendAir 200, Prosoco R-Guard CAT 5, Tyvek Commercial Wrap, or others.
3. **Address Hygrothermal Concerns** – This is not an issue with CMU back up walls; however this is a significant concern with steel stud back up walls. ECS recommend moving as much insulation as practical to the exterior of the air and WRB, ideally providing continuous insulation (ci) on the exterior with stud cavity insulation only utilized as needed for acoustic performance. One scenario reviewed showed an R13 batt in a 6" steel stud cavity – the challenge with this installation is keeping the insulation tight to the exterior sheathing in a too large cavity to mitigate risks for effective R value loss and excessive moisture/condensation on the exterior sheathing.
4. **Ideal Wall Assembly**: The following recommendation is based on the concepts above and will provide the 'best" performance from a hygrothermal, water/air penetration, and combustibility standpoint. This is not intended to be the only recommendation; however, it is a good target to understand as schedule and cost decisions move us away from this

ideal assembly the system incurs risks that need to be otherwise mitigated in the project design and use. Ideal wall assembly from interior to exterior:

a. Backup of CMU or Steel Studs and GWB Sheathing;
b. Dedicated low combustibility WRB (Momentive SilShield 2600, DefendAir 200, Prosoco R-Guard CAT 5, Tyvek Commercial Wrap, or others);
c. Non-Combustible Insulation (3" of CavityRock DD for U=0.064)
d. Air Space (may be a little as 5/8")
e. Non-Combustible Cladding (masonry, terracotta, single skin metal panel, etc.) - attachment to the air and WRB shall be with thermally improved systems with discrete (non-continuous) clips/angles directly attached to structure at the WRB to allow for sealing as needed.

Whole Building Performance –

5. **Whole Building Air Leakage Performance Requirements and Verification:** Whole building air tightness is a significant driver to occupant comfort, indoor environmental quality, HVAC-R equipment sizing, operational efficiency, and many more aspects of building performance. ECS recommends consideration increase the whole building air tightness by incorporating the following:

f. Set a performance target or 0.40 cfm/sqft of enclosure at 75 Pa (IECC and GSA) or less, ideally 0.25 (IgCC and USACE);
g. Incorporate air barrier location, design, and detailing as a requirement for FCPS design documents;
h. Require air barrier assemblies to meet ASTM E2357 for incorporation as the air barrier system;
i. Provide regular onsite observation of air barrier installation during construction (incorporated into BECx currently);
j. Test an onsite off-building performance mockup for air tightness and leakage path detection to inform potential improvements; and
k. Perform whole building air leakage testing per ASTM E3158 or the USACE Protocol to target performance criteria.

6. **Onsite Off-Building Performance Mockup Construction and Testing:** Performance mockups are a good tool to gain a better understanding of designed performance in the field. Expansion of this tool also provides an excellent learning opportunity to meet and exceed performance targets and to mitigate potential failures on the occupied building. Performance mockup may include at a minimum the following testing:

l. ASTM E1186 Air Leakage Site Detection (smoke and bubble gun)
m. ASTM E793 Quantitative Air Leakage
n. AAMA 501.1 Dynamic Water Penetration Resistance
o. ASTM E1105 Static Water Penetration Resistance
p. Additional test may include: WRB adhesion; roof uplift; roof leakage; structural loading, etc.

We are available and happy to discuss these further at the teams convenience.

Regards,

Keith

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