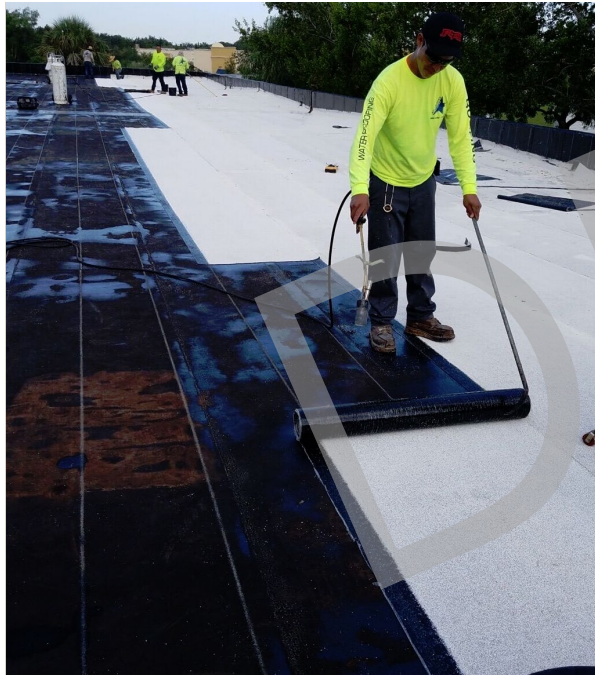


SBBC Workshop

Roofing Overview





Introduction to *SMART* Program Roofing

Assessing the Causes, Costs, & Conditions

- **A team established** to perform a **comprehensive review of roofing conditions** affecting the SMART program.
- **Comparable agencies** including Miami-Dade and Palm Beach County School Districts were compared for **increased objectivity and context**
- The review **measured original cost estimates and scope of work** for individual schools as well as the following factors
 - ✓ Applicable roofing design standards
 - ✓ Florida Building Code requirements
 - ✓ BCPS Building Department Procedures
 - ✓ Market Conditions
- **Met with** Roofing Contractors for Roundtable Discussion



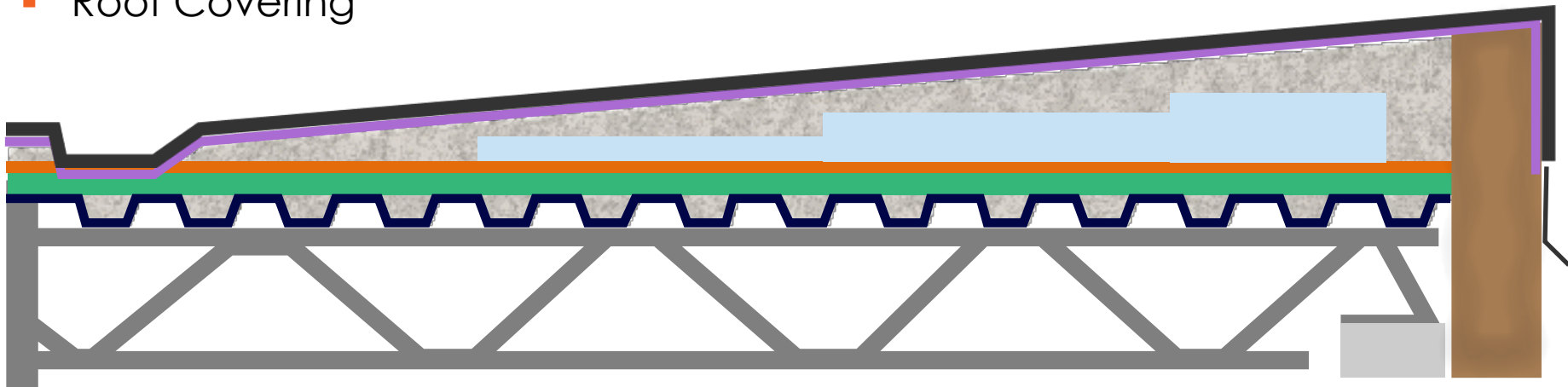


Roofing 101

The Anatomy of a School Roof

Roofing Assembly: The interaction of roofing components that include:

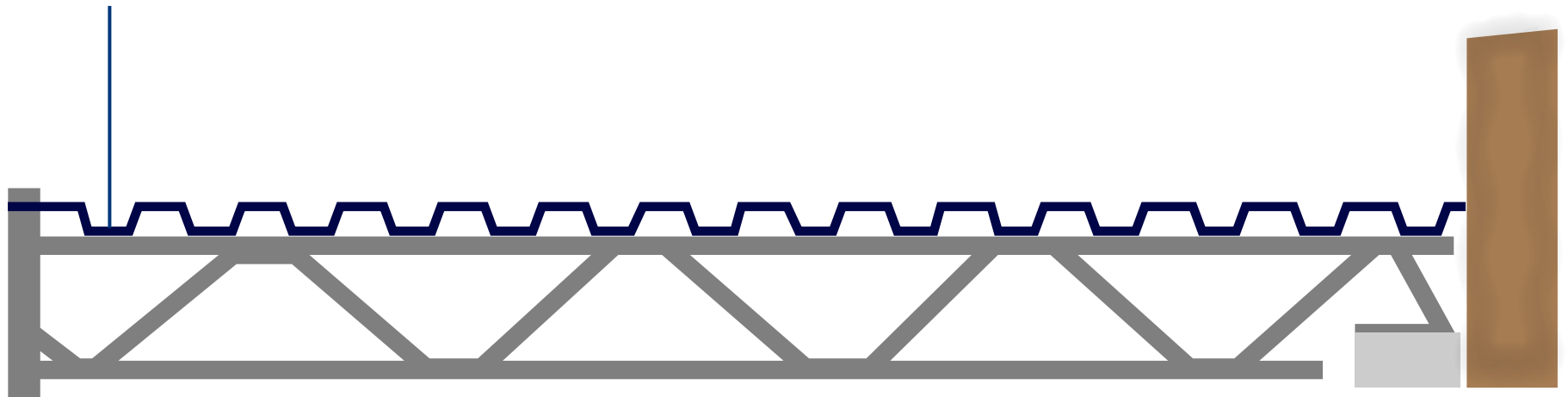
- Roof Deck
- Vapor Retarder (if Applicable)
- Insulation
- Roof Covering



The Anatomy of a School Roof

Roofing Components – Temporary Roof/Dry-in

Existing Galvanized
Steel Deck

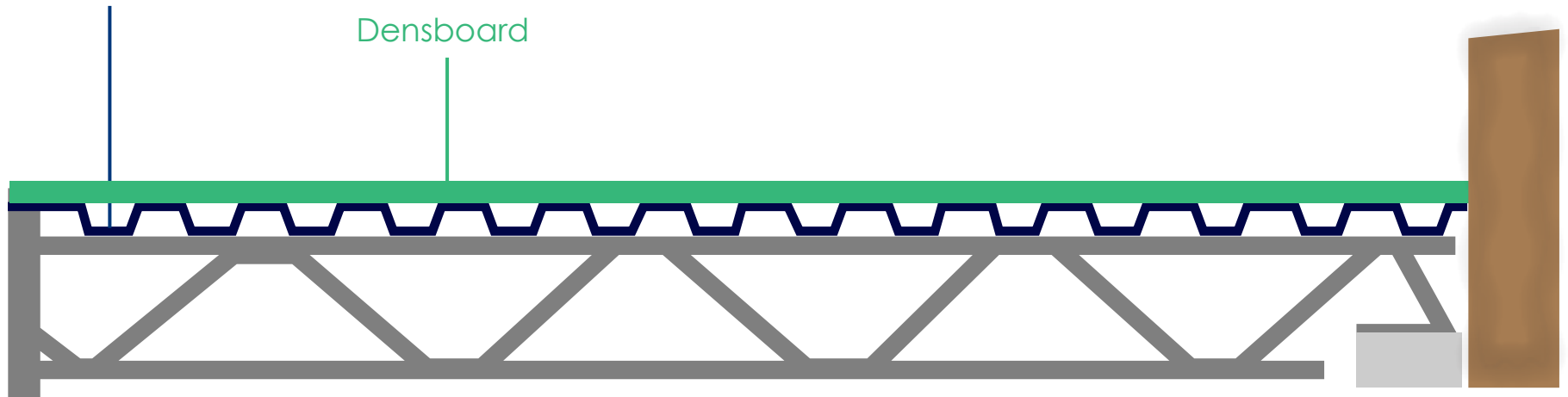


The Anatomy of a School Roof

Roofing Components – Temporary Roof/Dry-in

Existing Galvanized
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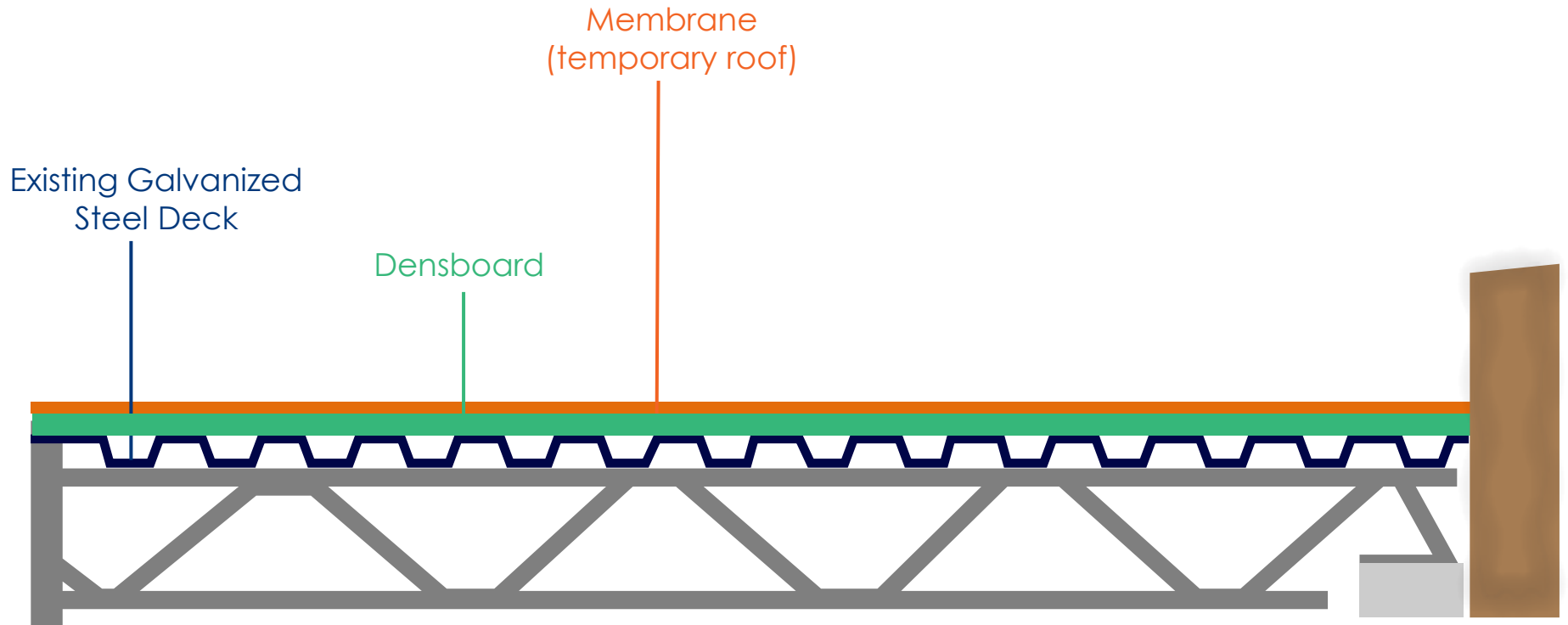
Densboard



DRAFT AS OF 12/7/2018

The Anatomy of a School Roof

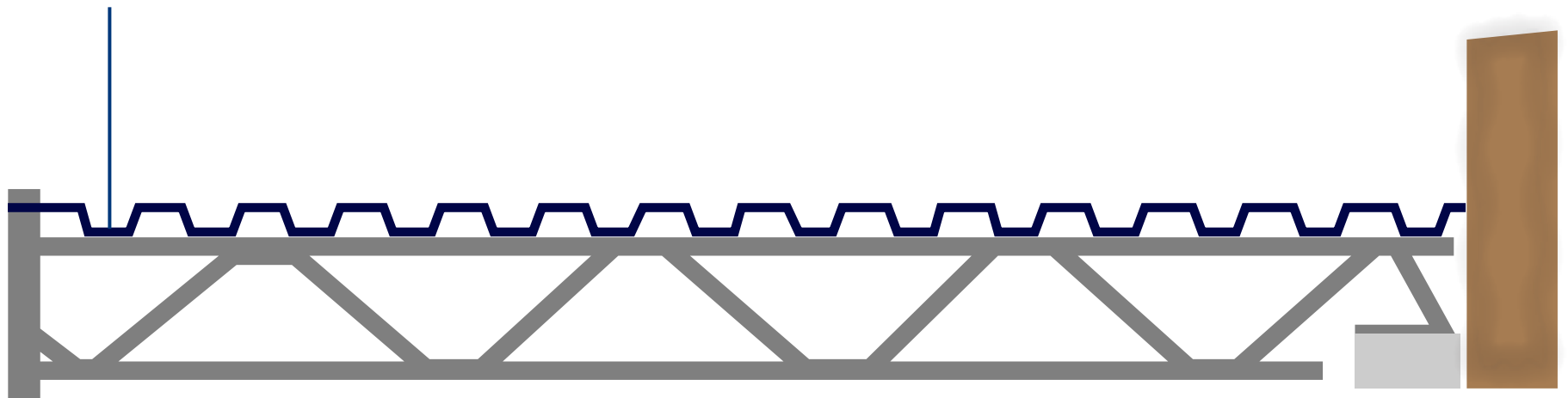
Roofing Components – Temporary Roof/Dry-in



The Anatomy of a School Roof

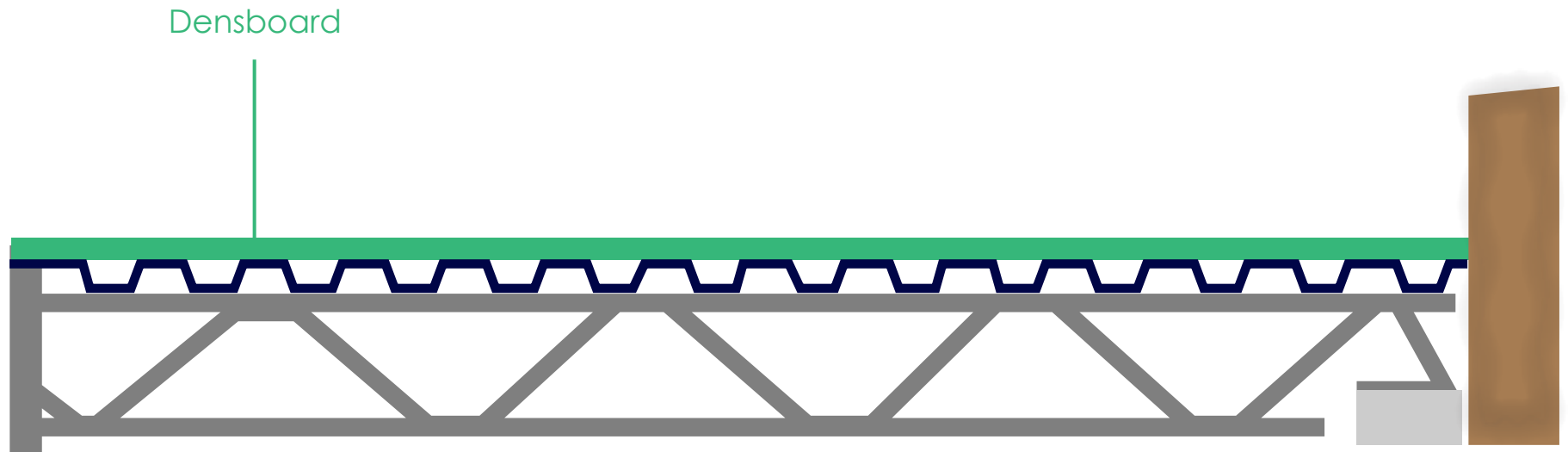
Roofing Components – Complete Roof

Existing Galvanized
Steel Deck



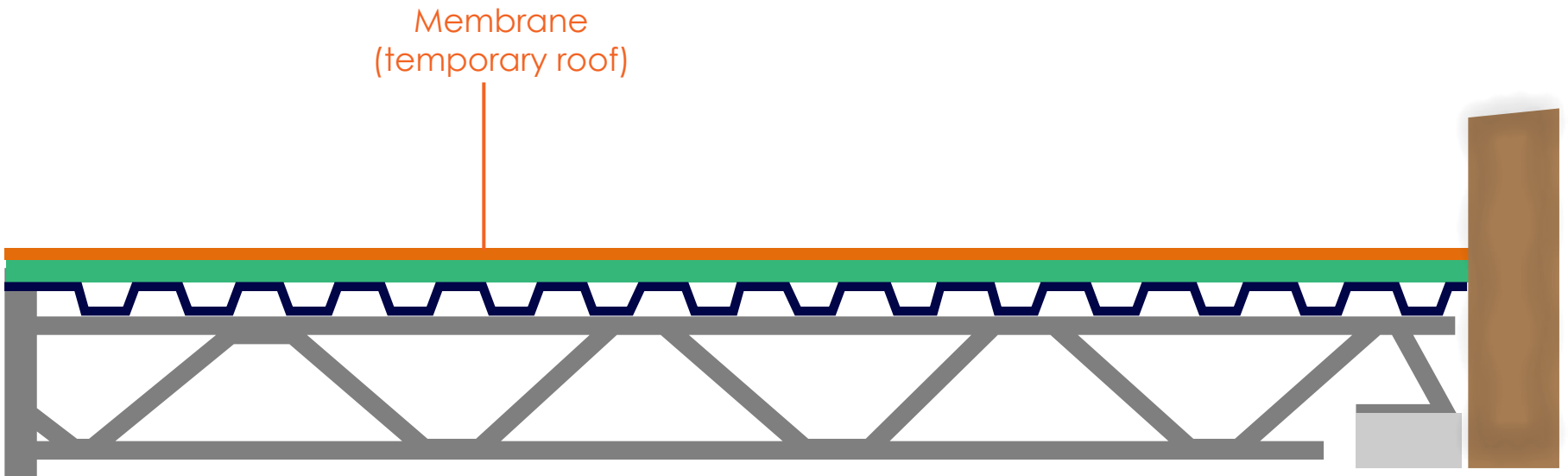
The Anatomy of a School Roof

Roofing Components – Complete Roof



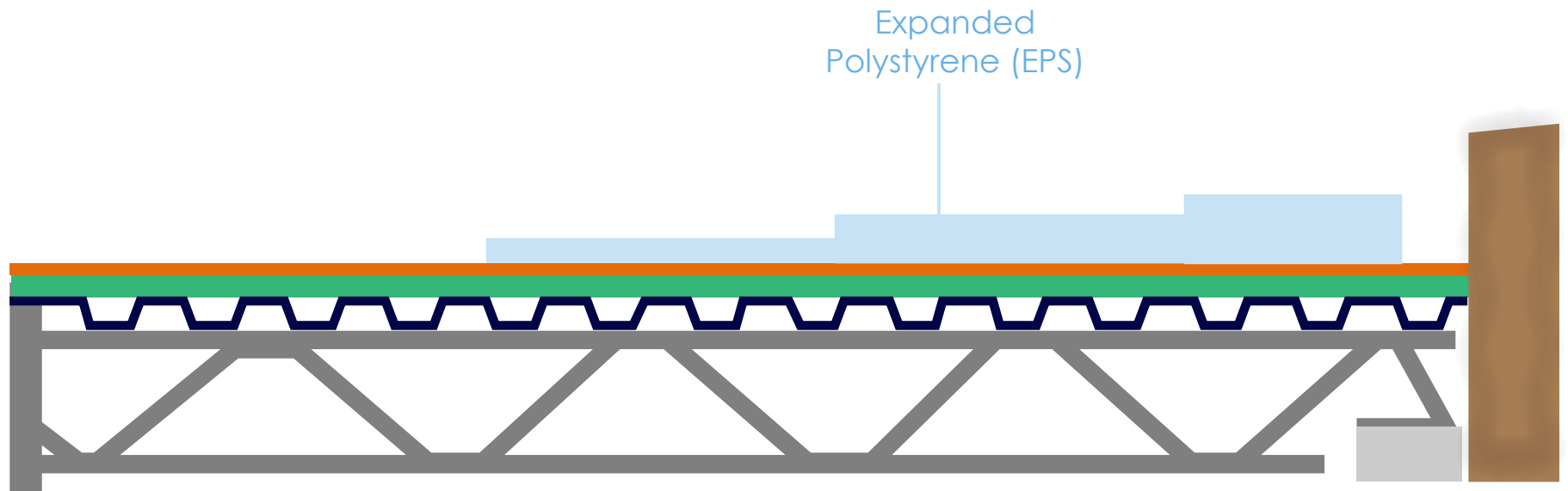
The Anatomy of a School Roof

Roofing Components – Complete Roof



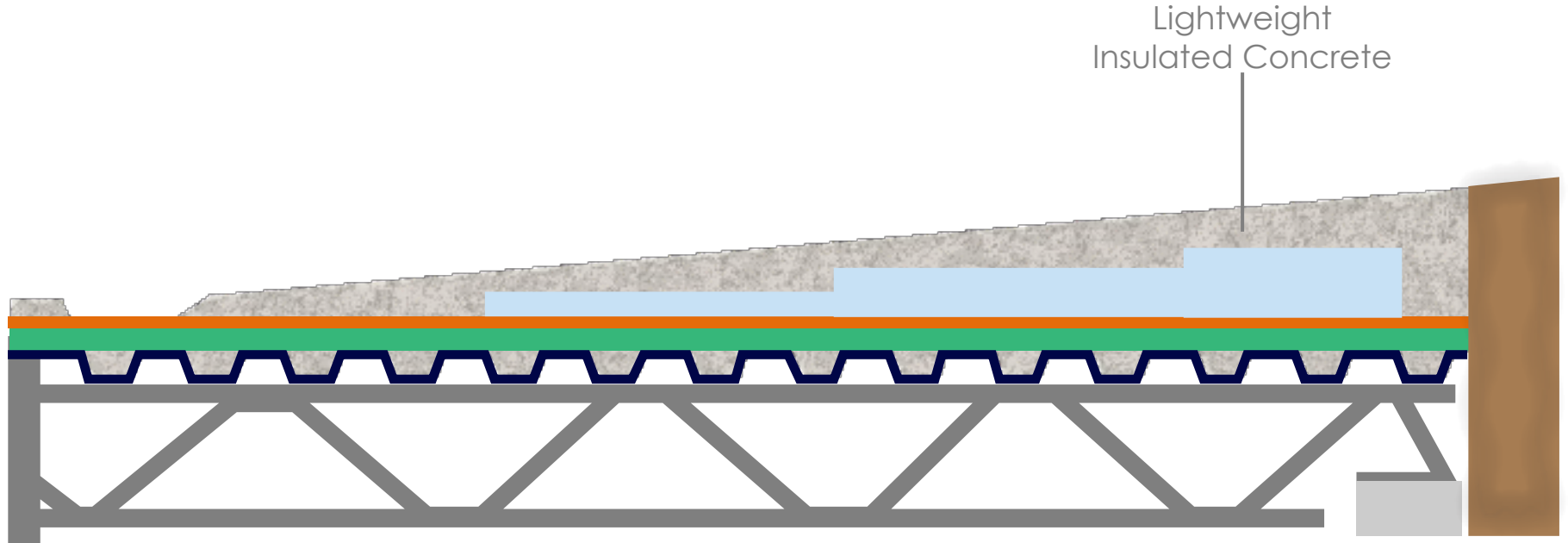
The Anatomy of a School Roof

Roofing Components – Complete Roof



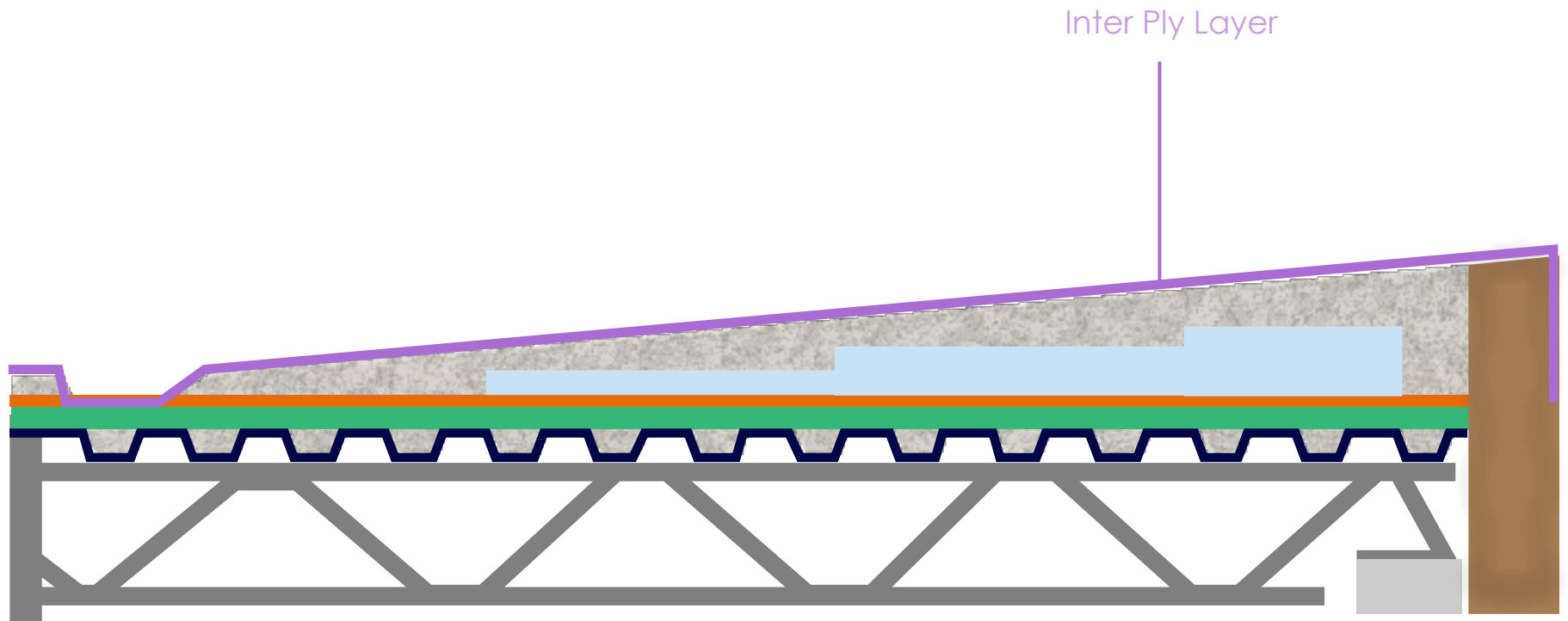
The Anatomy of a School Roof

Roofing Components – Complete Roof



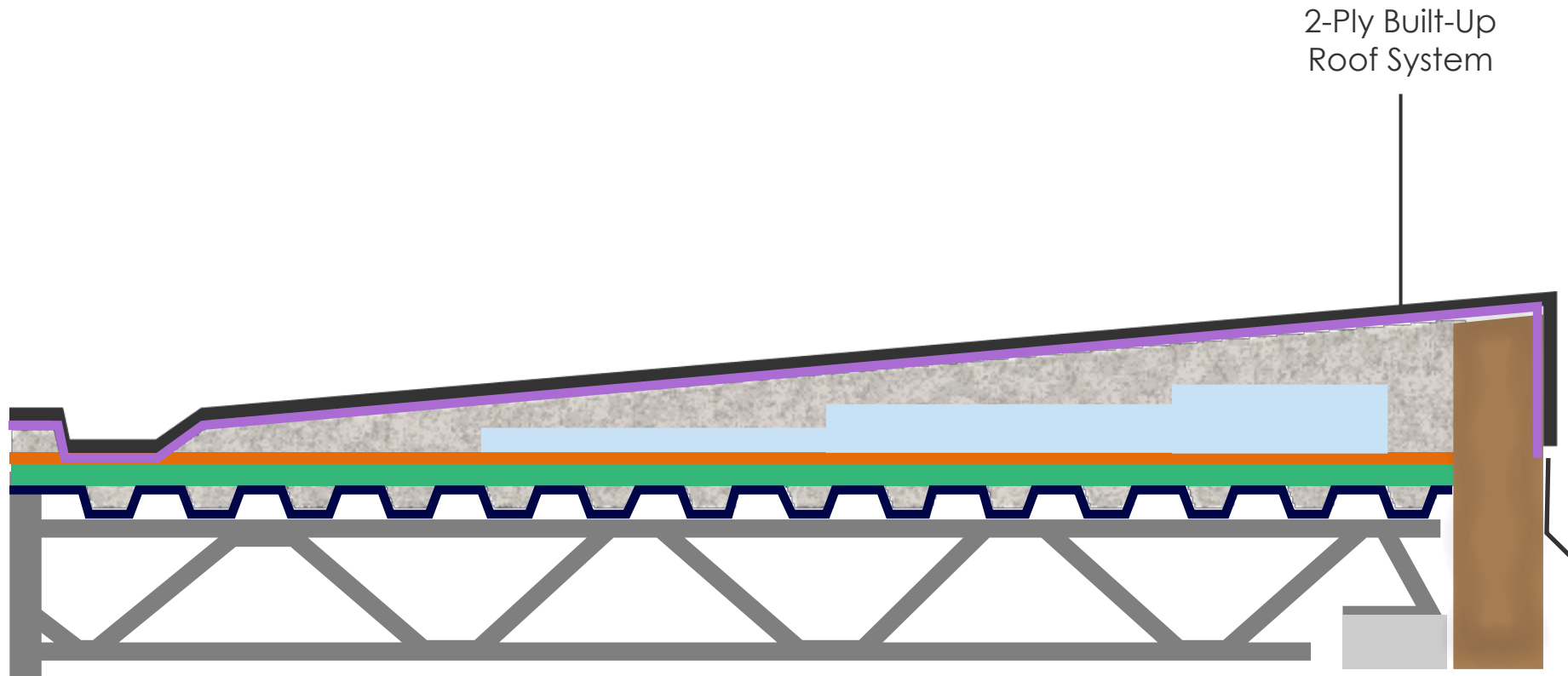
The Anatomy of a School Roof

Roofing Components – Complete Roof



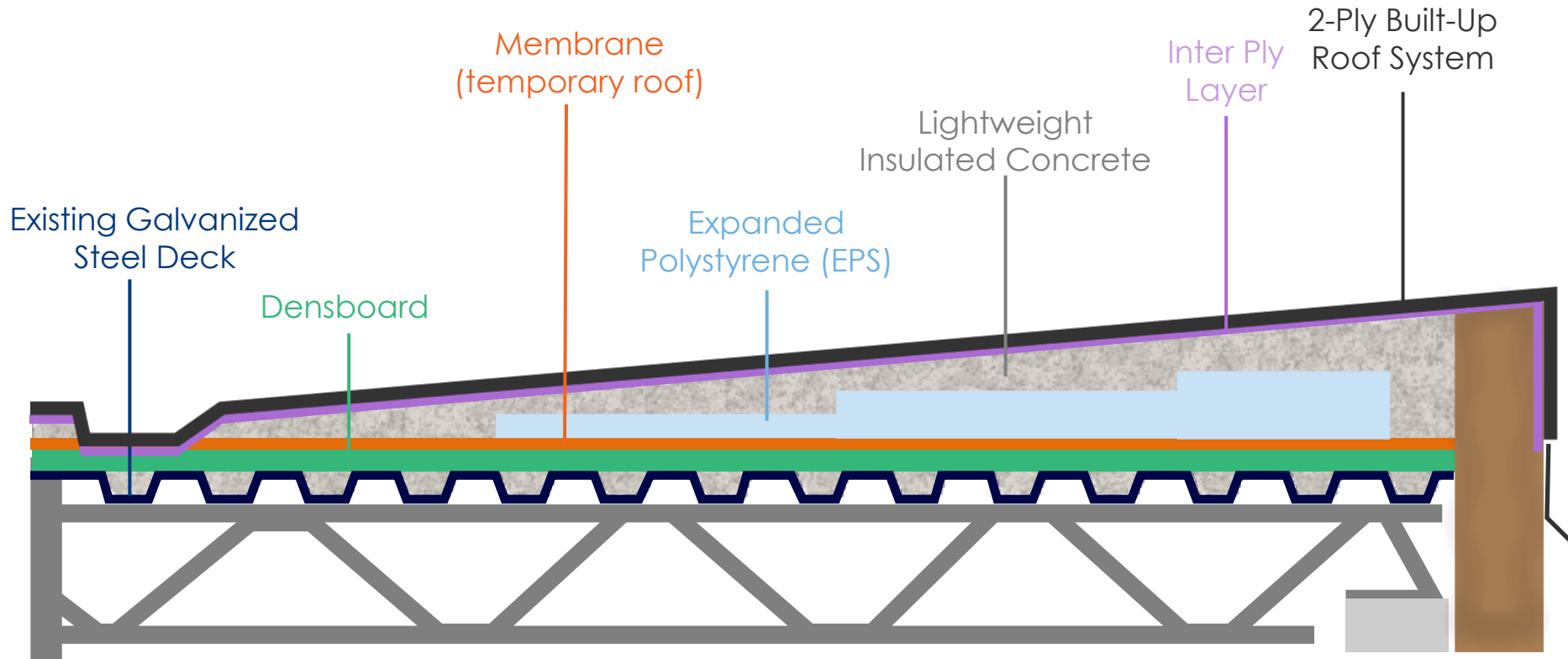
The Anatomy of a School Roof

Roofing Components – Complete Roof



The Anatomy of a School Roof

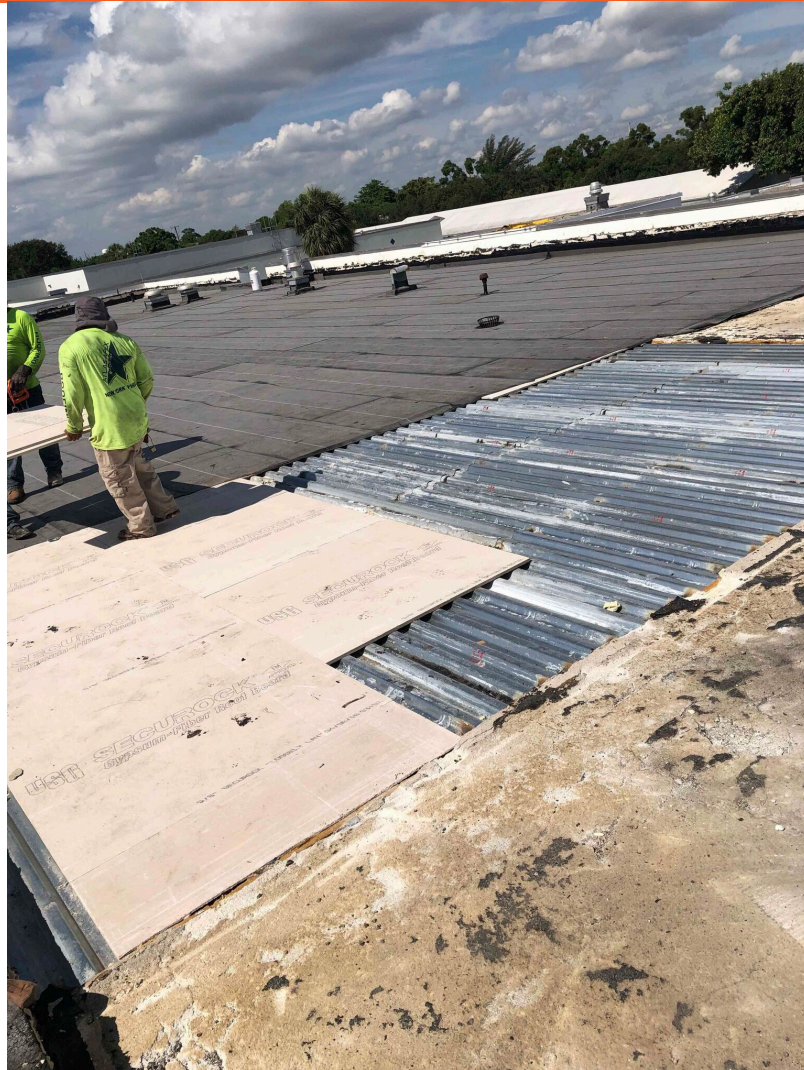
Roofing Components – Complete Roof



4 Phase Temporary Roof/Dry-in Example

As discussed in the scheduling presentation...

Roofing projects follow a phased work plan to accommodate the occupied facilities below



4 Phase Temporary Roof/Dry-in Example

1. **Lightweight after membrane removal**
2. Deck after lightweight removal
3. Densboard over existing deck
4. Temporary membrane to dry in roof

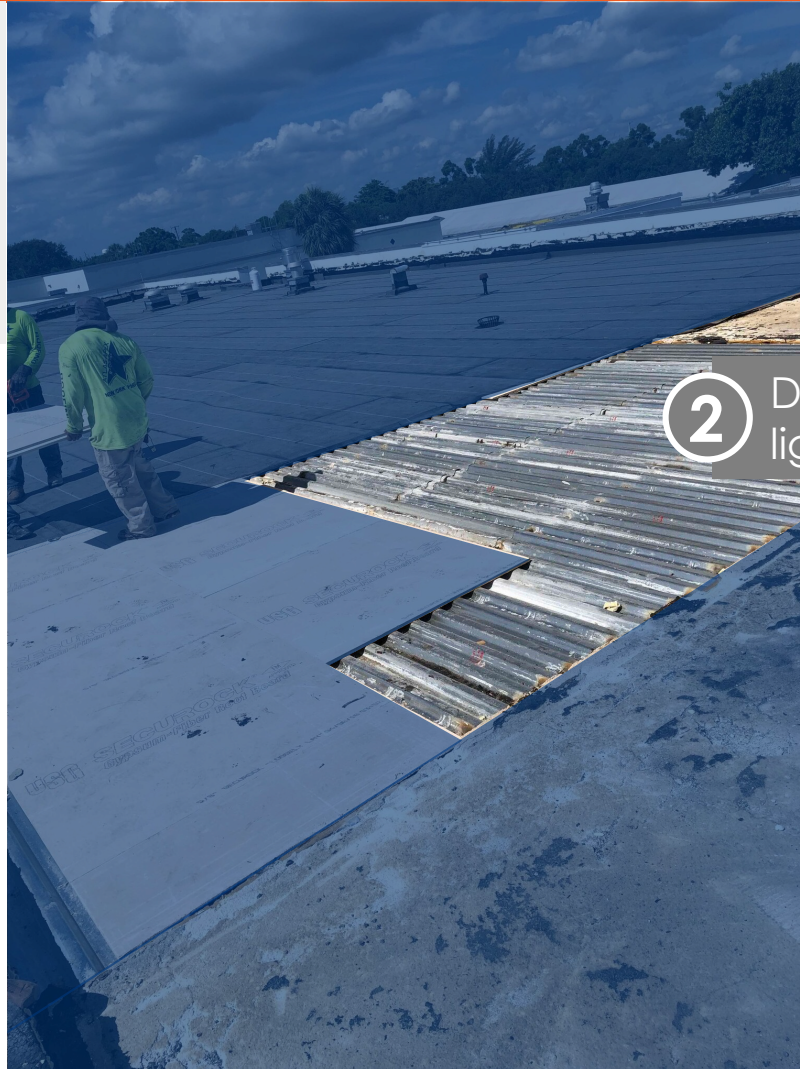


1 Lightweight after membrane removal



4 Phase Temporary Roof/Dry-in Example

1. Lightweight after membrane removal
2. Deck after lightweight removal
3. Densboard over existing deck
4. Temporary membrane to dry in roof



2 Deck after lightweight removal



4 Phase Temporary Roof/Dry-in Example

1. Lightweight after membrane removal
2. Deck after lightweight removal
- 3. Densboard over existing deck**
4. Temporary membrane to dry in roof



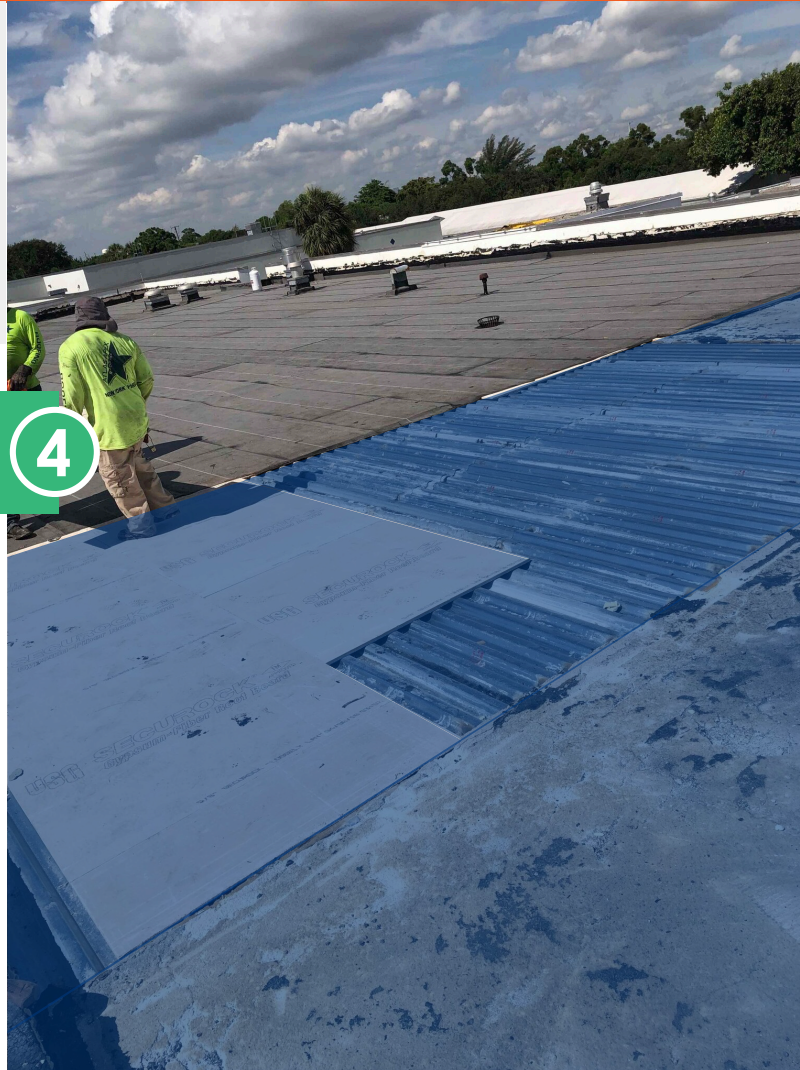
Densboard
over existing deck **3**



4 Phase Temporary Roof/Dry-in Example

1. Lightweight after membrane removal
2. Deck after lightweight removal
3. Densboard over existing deck
4. Temporary membrane to dry in roof

Temporary membrane
to dry in roof



4



Sampling of BCPS Roofing Projects

Indian Ridge Middle School



Before



During



After



Sampling of BCPS Roofing Projects

Manatee Bay Elementary School



Before



During



After



Sampling of BCPS Roofing Projects

Coconut Creek Elementary School



Before



Temporary Membrane
Installation



Ready for Cap Sheet



Sampling of BCPS Roofing Projects

Cypress Elementary School



Before



During



After



Reason's for Roof Replacement

Degradation of substrate due to constant water intrusion

The result: Roof solidity is like **walking on sand** vs **walking on a sidewalk**



Why 1/4" per Foot Roof Slope is Required

- **The BCPS Building Department has done the following:**
 - ✓ reviewed the 1/4" per foot roof slope issue numerous times
 - ✓ been enforcing this code interpretation since 2005

Supporting sections of the Florida Building Code to provide 1/4" per foot roof slope

The referenced Exception in Section 1511.1 that reroofing is not required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units for roofs that provide positive roof drainage does not apply as it is not one of the referenced sections noted in Section 1501 for high-velocity hurricane zones.

CHAPTER 15 ROOF ASSEMBLIES AND ROOFTOP STRUCTURES | SECTION 1501 GENERAL

- **1501.1 Scope.** The provisions of this chapter shall govern the design, materials, construction and quality of roof assemblies, and rooftop structures
- **Exception:** Buildings and structures located within the high-velocity hurricane zone shall comply with the provisions of Section 1503.7 and Sections 1512 through 1525. (emphasis added)



Why 1/4" per Foot Roof Slope is Required

Supporting sections of the Florida Building Code to provide 1/4" per foot roof slope

The 2017 Florida Building Code governs the minimum requirements and standards of the industry for roofing system installations, Section 1515.2.2 deals with the requirements for minimum slope for building and structures located in within the high-velocity hurricane zones

- **1515.2.2 Minimum slope.**

All roofing assemblies must be installed in compliance with the slope requirements specified in the product control approval, in compliance with Table 1515.2.

- **1515.2.2.1 In new construction the minimum deck slope shall be not less than 1/4:12.**

Understanding the definitions and additional code sections that apply. Per the Florida Building Code - Section 453 State Requirements for Educational Facilities it has always been the position of the BCPS Building Department that on existing roof replacement projects in which the existing substrate system is removed due to the existing conditions and replaced with new installation of lightweight insulating concrete as the substrate, we have required compliance with the FBC as a new roof system, and therefore must meet the minimum design slope requirements of one-quarter unit vertical in 12 units horizontal (2-percent slope) per Section 1515.2.2.1.

SECTION 453 - STATE REQUIREMENTS FOR EDUCATIONAL FACILITIES - DEFINITIONS

- **453.5.14 RENOVATION.** The rejuvenating or upgrading of existing facilities by installation or replacement of materials and equipment. The use and occupancy of the spaces remain the same. **Only that portion of the building being renovated must be brought into compliance with the Florida Building Code (emphasis added)** and Florida Fire Prevention Code as adopted by the State Fire Marshal unless the renovation adversely impacts the existing life safety systems of the building.



Why 1/4" per Foot Roof Slope is Required

Supporting sections of the Florida Building Code to provide 1/4" per foot roof slope

- **1515.2.2.1** In new construction the minimum deck slope shall be not less than 1/4:12.

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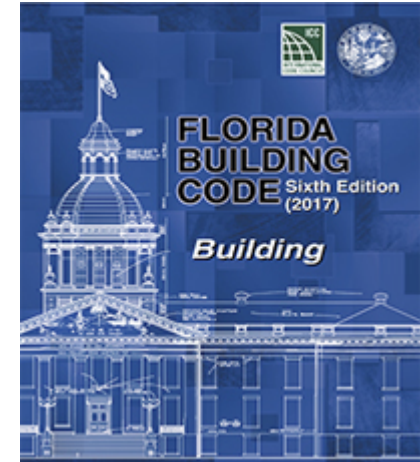


Why 1/4" per Foot Roof Slope is Required

Supporting sections of the Florida Building Code to provide 1/4" per foot roof slope

SECTION 1513 - HIGH-VELOCITY HURRICANE ZONES—DEFINITIONS

- **ROOFING ASSEMBLY.** An assembly of interacting roofing components [includes the roof deck, vapor retarder (if present), insulation, and roof covering]
- **RECOVERING.** The process of covering an existing roofing assembly with a new roofing system or a prepared roofing system.
- **REROOFING.** The process of recovering or replacing an existing roofing system, either in its entirety or in existing sections.
- **ROOF COVERING.** An assembly of multiple field-applied components or a single component designed to weatherproof a building's top surface. A roof covering may be a roofing assembly or form a portion thereof.
- **ROOFING COMPONENT.** A roofing product that is incorporated into various roofing assemblies.
- **ROOF DECK.** Solid or spaced sheathing to which the roofing or waterproofing system is applied.
- **ROOF REPLACEMENT.** The process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering.



Why Lightweight Insulating is Preferred

Lightweight Insulating Concrete



- ✓ Most **cost effective**
- ✓ Higher "R" Rated
- ✓ **IF MAINTAINED** – in 25 years only new membrane will be needed

Polyiso Board Insulation



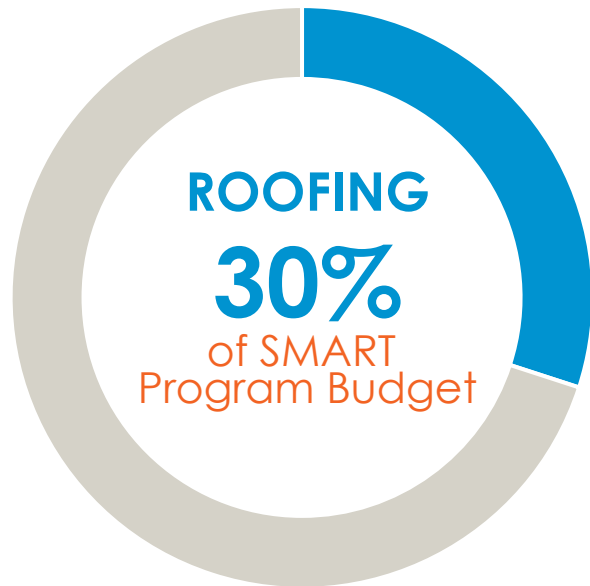
- ✓ **More costly** - short and long term
- ✓ More often **re-roof will require replacement** of Polyiso Board
- ✓ **Typically** a one-time use
- ✓ More **labor intensive**





Why Roofing is Important to SMART

Roofing: The Significance for SMART



Compared to original estimates, actual roofing costs are trending consistently

Up to 3x Original Budget



Roofing: The Significance for SMART

of projects + Higher Costs = Significant Impact on the SMART Program

Due to the Magnitude of the roofing program
a slight change can cause a big impact

Example of Impact

18 Million SF of Buildings to be Roofed

\$1/SF Increase = **\$18 Million** Cost Impact





Recommended Path Forward

Recommended Path Forward

- **Continue to Expand** the pool of qualified and Certified Roofing Contractors for better competition
- **Consider** pre-qualification and evaluations of both General Contractors and Sub-Contractors for **roofing-related work**
- **Explore** separation of roofing from project scope balance and bid separately on a case by case basis
- **Implementation** of a roof maintenance and warranty program is **STRONGLY RECOMMENDED**
- **Schedule** mandatory roof permitting seminars for designers and contractors to limit underestimations and continued scope fluctuations within **1Q 2019**





Questions & Answers

The School Board of Broward County, FL

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Donna P. Korn, Vice Chair
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Robin Bartleman
Patricia Good
Laurie Rich Levinson
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