

265 Parkway Blvd Roof Conditions & Solutions Report

Case # 0265-01

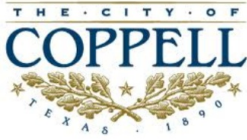
Prepared By
Russell Roberts

Prepared For
Steve Shore

October 30, 2020

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Client Data

Client: The City of Coppell

Client Data

Name	The City of Coppell		
Address 1	265 Parkway Boulevard		
City	Coppell	State	Texas
ZIP	75019	Country	United States

Contact Info

Contact Person	Andrew Moore	Title	Facilities Supervisor
Mobile Phone:	469-418-0090	Office Phone:	-
Email:	AMoore@CoppellTX.Gov		

Client: The City of Coppell

Facility: 265 E Parkway



Facility Data

Address 1	265 E Parkway Boulevard
City	Coppell
State	Texas
ZIP	75019
Type of Facility	Municipal
Square Footage	15,844
Contact Person	Andrew Moore

Notes

Case #0265-01

As requested by City of Coppell, an investigation of the roofing system including moisture scan and destructive testing at the referenced address above was performed on May 28, 2020 between 7:00 AM – 10:00 am.

The Garland Company, Russell Roberts, Drone Roofing, Tyler Walker and arrived on site at 265 E Parkway, Coppell, TX 75019 at 7:00 am to meet with City of Coppell, Facilities Department (referred to as "Client" hereafter).

Introduction:

This report contains current roof conditions and ASTM, City codes applicable to the roof system installed at 265 E Parkway, Coppell, TX 75019. Please note that if new or additional information becomes available after the date listed on this report relative to these roof systems, The Garland Company (referred to as "Manufacturer" herein) reserves the right to revise report for case #0265-01 based on new information provided after the date of May 28, 2020.

Project Description:

This investigation is limited to the performance of roofing materials and assembly of roof components at the subject property. The subject project consisted of a flat roof section and metal flashing installed on perimeter of building, all part of one building located at 265 E Parkway, Coppell, TX 75019.

Scope of Work:

Contractor scope of work for this project is to determine IF the integrity of roofing materials applications is in compliance with the ASTM requirements, local building codes and investigate why and where existing moisture is trapped in roof assembly.

This Investigation(s) was organized to determine:

- *To document the cause of reported roof leaks.*
- *If the single ply roofing membrane with liquid applied roofing system is retaining moisture from condensation below roof deck.*
- *If diminution of insulation board from very high amounts of unwanted moisture trapped in roof assembly has reduced or nullified required R Value required by IECC.*
- *If the roofing assembly including insulation boards, cover-boards and fasteners are performing per ASTM E108 and ASTM E 84 in accordance best practice with manufacturer's current installation instructions and local building codes.*
- *If the fasteners have been compromised by moisture trapped in roof assembly causing deck substrate premature failure.*

Active Participants:

The Garland Company, Drone Roofing, City of Coppell

Site Visit:

May 28, 2020 Initial trip to observe and document all roofing
assemblies, complete moisture scan and accessories general conditions
(Manufacturer, Contractor, Client,)

Property Description and Site Conditions:

Community Location – Coppell, TX

Municipal Facility

Elevation – 2 Story >30' mean roof height

Framing – Masonry

Foundation – Slab on grade

Exterior – Masonry Wall

Directional Setting – North

Roof Slope/Pitch – Flat: ¼": 12

Roof Design – < > low slope

Wind Speed – International Building Code (IBC) designated wind speed is 110 mph per .

Exposure – B

Codes and Installation Instruction:

Coppell is a city in the [U.S. state](#) of Texas, Most of the city is in Dallas County.

City of Coppell building department adopted the 2018 International Building Code (IBC).

City of Coppell building department adopted the 2018 International Energy Code Council (IECC) design requirements.

IBC 2018: Section 1403.2 Flashings shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it to the exterior. Flashing shall be installed at the perimeters of exterior. Flashings shall be installed at the perimeter of exterior door and window assemblies, penetrations and terminations of exterior wall assemblies, exterior wall intersections with roofs, chimney, porches, decks, balconies and similar projections and at built-in gutters and similar locations where moisture could enter the wall. Flashing with projecting flanges shall be installed on both sides and the ends of copings, under sills and continuously above projecting trim.

IBC 1503.3.1 requires roof covering shall be applied and installed in accordance with this code and the manufacturer's instructions such that the roof covering shall serve to protect the building or structure. Exhibit A.

Wall Coping Metal (Parapet):

For parapet walls, positive slope to the roof side should be provided at the top of the wall. A continuous tapered shim installed over the wood blocking is a common method of sloping the top of the wall to the roof side. When weather-tight seams are not installed, copings should have a continuous sheet membrane liner under the coping that should be capable of providing a secondary water barrier. If installed, a sheet membrane liner may also act as an isolation sheet for incompatible materials or act as a slip sheet for materials with differential movement.

Roofing Product Identification:

Manufacturer's specifications and design requires roof surface to provide positive discharge of moisture from roof assembly, Ultra-Violet ray protection and sustain life cycle of design according to ASTM requirements.

- *The Garland Company observed high levels of moisture trapped in roof assembly.*
- *The Garland Company observed moisture degraded insulation board.*
- *The Garland Company observed detached facer on insulation board from moisture trapped in roof assembly.*
- *The Garland Company observed missing vapor barrier over wood deck.*
- *The Garland Company observed liquid applied roofing system detached from original EPDM roof membrane from expansion of trapped moisture.*
- *The Garland Company observed presence of moisture on wood deck surfaces.*
- *The Garland Company observed rapid galvanic corrosion on fastening plates from trapped moisture in roof assembly.*
- *The Garland Company observed galvanic corrosion on 16D nails mechanically attaching wood deck to structure.*
- *The Garland Company observed obsolete insulation caused by moisture degradation.*

- The Garland Company observed moisture stains under wood deck during roof leak investigation.
- The Garland Company observed blisters on upper roof section.

Conclusion:

Based on physical roof discoveries, destructive investigation (see photographic documentation section of this report) moisture scan, IBC 2018, ASCE 7-10, ASTM and all applicable codes our recommendation is to remove all roof assemblies down to roof deck, install vapor control layer, install insulation, recovery board, base sheet, fleece back according to manufacturer's recommendations based on all applicable codes.

CRITICAL ITEMS (Listed by priority)

Moisture Trapped in existing Roof Assembly with No Vapor Barrier:

- Moisture trapped in roof assembly and wood deck compromise wind uplift fastening capabilities of existing roof assembly to structure during high winds creating upward pressure applied to structure increasing chance for roof assembly to detach from structure due to extreme suction loading of single ply membrane.
- Moisture trapped in roof assembly under standard atmospheric pressure an 80 degree Fahrenheit temperature rise can expand water 1,500 times its original liquid volume. This expansion of moisture increases live load requirements that were NOT included in original building design increasing chance of structural deck collapse.
- Moisture trapped in roof assembly on existing roof assembly creates higher humidity levels as a direct result of NO VAPOR BARRIER separating interior of structure from wet insulation board installed directly over wood deck. High humidity levels will increase as HVAC system removes stagnate air from building and "Dumps" fresh air into structure. Condensation on windows and window frames are direct consequential effects occurring from missing vapor barrier.
- Moisture trapped in roof assembly migrating into interior of building also effects breathable spaces below roof deck from unwanted moisture in nominal space.
- Moisture degraded insulation board: "Liquid water should never be present in a building system. If an insulation, polyiso or polystyrene, is submerged in water, the insulation benefit disappears as the water short circuits around the insulation. Insulations must be kept dry. If minor contact does occur, the foil facings and closed cells of polyiso provide excellent water resistance." (PIMA Technical Bulletin #402 "Polyiso Insulation and Water Absorption")

Third Party References listed below:

1. PIMA Technical Bulletin #402 - Poly Insulation and Water Absorption
2. 1000 reasons not roof over wet insulation, Dick Baxter, NRCA President 1986
3. RCI - Its not the heat, its the humidity
4. RCI- AVOIDING CONDENSATION IN LOW SLOPE ROOFING ASSEMBLIES, 2018

Asset Information

Name	Date Installed	Square Footage	Roof Access
Low Slope: Lower Roof	N/A	5,198	Ladder Needed
Low Slope: Upper Roof	N/A	10,894	Ladder Needed





Roof Section Photo

Client: The City of Coppel

Facility: 265 E Parkway

Roof Section: Low Slope: Lower Roof



Information

Year Installed	N/A	Square Footage	5,198
Slope Dimension	1/4"	Eave Height	30
Roof Access	Ladder Needed	System Type	Liquid Coating
		Contractor	Drone Roofing & Construction Tyler Walker (817) 559-7288 (Office) (817) 559-7288 (Mobile) tylerwalker@drone-roofing.com

Assembly

Roof #	Layer Type	Description	Attachment	R-Value	Thickness
1	Surfacing	Reflective	Cold applied	.1	55 Mils
1	Membrane	EPDM - unreinforced	Fully Adhered	-	45 Mils
1	Insulation	Polyisocyanurate	Mechanically attached	12	2"
1	Deck	Plywood	Mechanically attached	1.25	1"

Details	
Perimeter Detail	Parapet Wall
Flashing Material	EPDM
Drain System	Internal Roof Drains
Parapet Wall	Brick
Coping Cap	Metal

Inventory	
Inventory Type	Quantity
HVAC	3

Client: The City of Coppel

Facility: 265 E Parkway

Report Date: 05/28/2020

Title: Roof Core Analysis Photographic Report

Roof Section: Low Slope: Lower Roof

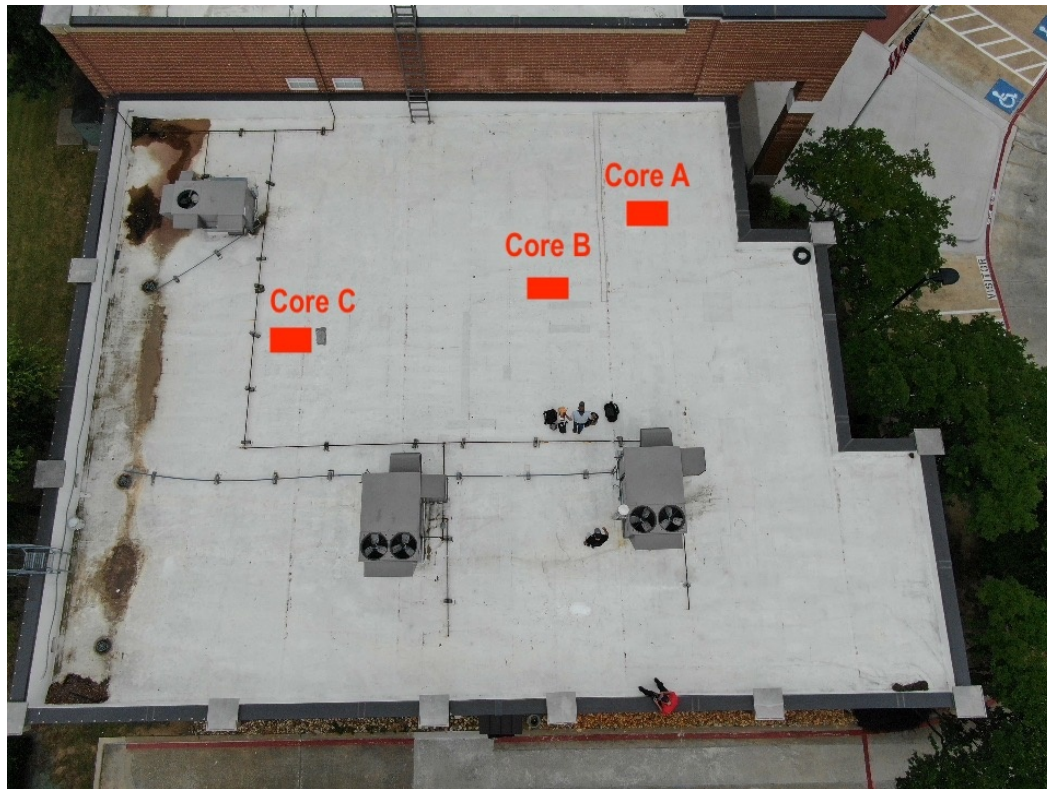


Photo 1

Photograph shows all core sections on lower roof section.

Photo 2

Photograph shows 100% reading on Tramex Model RWS (moisture detection) in roof assembly at Core A location.



Photo 3

Photograph shows dimension of lower roof section Core A.

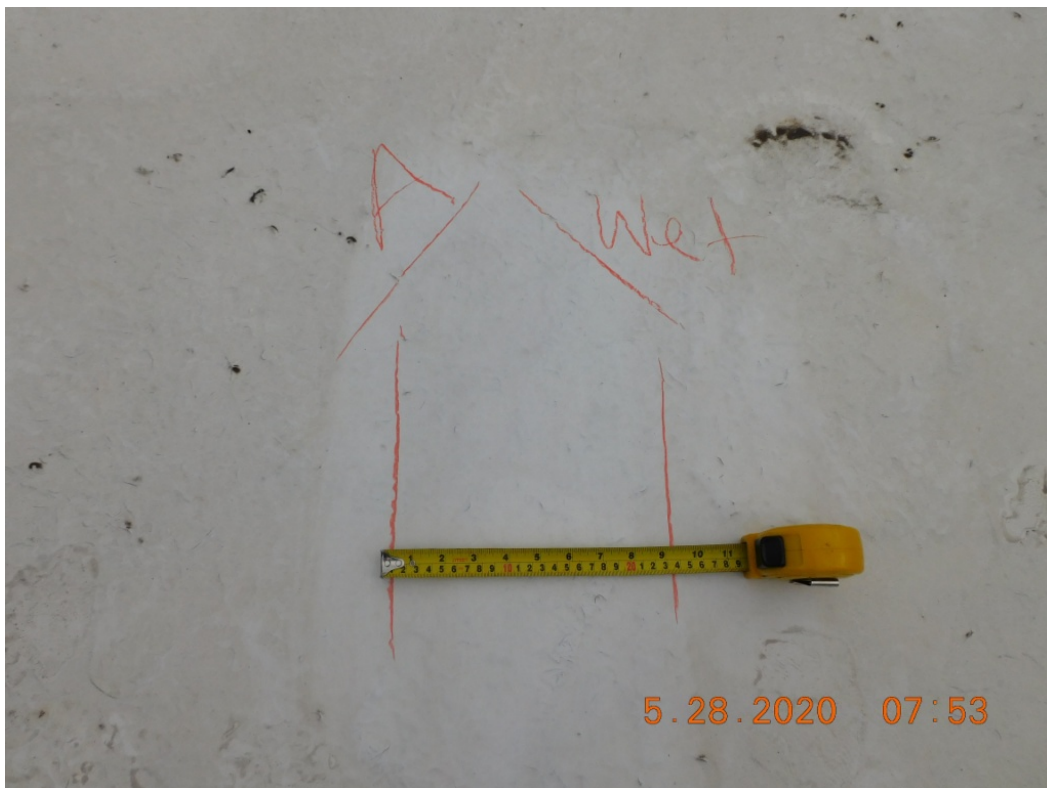




Photo 4

Observed liquid applied roofing system applied over original EPDM single ply roof membrane.



Photo 5

Observed moisture on insulation facer sheet.

Observed moisture present on underside of single ply roof membrane.



Photo 6

Observed moisture on insulation facer sheet.

Observed moisture present on insulation board surface.



Photo 7

10X View

Lower Roof Section:
Core A

Observed EPDM single ply membrane with liquid applied base layer and white reflective liquid applied roof system.



Photo 8

Observed moisture on insulation facer sheet.

Observed weather related impacts on insulation facer sheet from recent storm events.

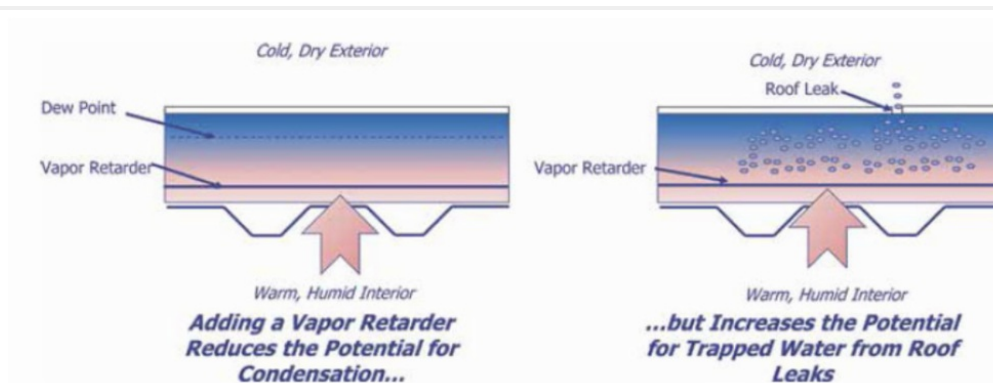


Photo 9

Diagram shows vapor retarder reduction of condensation trapped in roof assembly.

**Existing roof assembly does NOT have hygric buffer or vapor barrier installed. See photo above.



Photo 10

Observed moisture degradation of wood deck (circled in red).



Photo 11

Photograph shows moisture trapped in insulation board directly above moisture degraded wood deck.

*** Existing roof assembly does NOT Have hygric buffer or vapor barrier installed.

See diagram below for explanation.

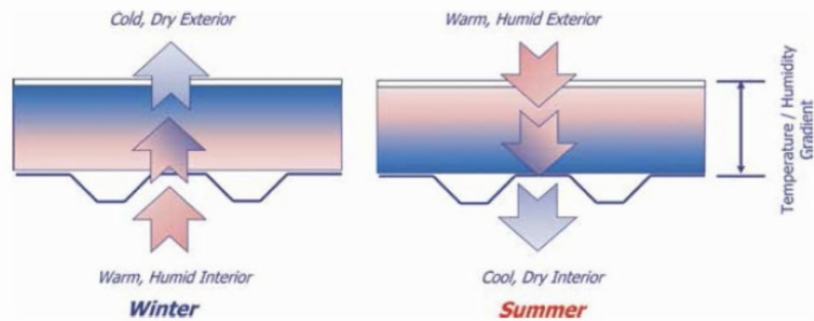
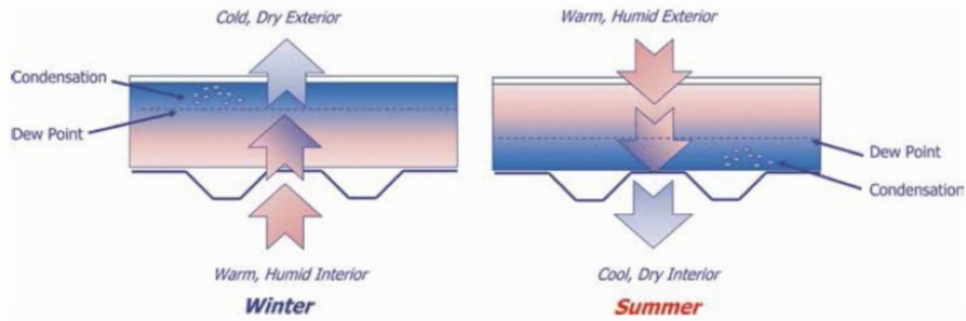


Photo 12

Diagram shows climate roof vapor drive effects on roof assembly.

Diagram shows roof dew point conditions based on climate and season.



(TOP) Figure 1: Winter and Summer roof vapor drive
(BOTTOM) Figure 2: Winer and summer roof dew point condition

Photo 13

Observed liquid applied roof system installed over original roof.

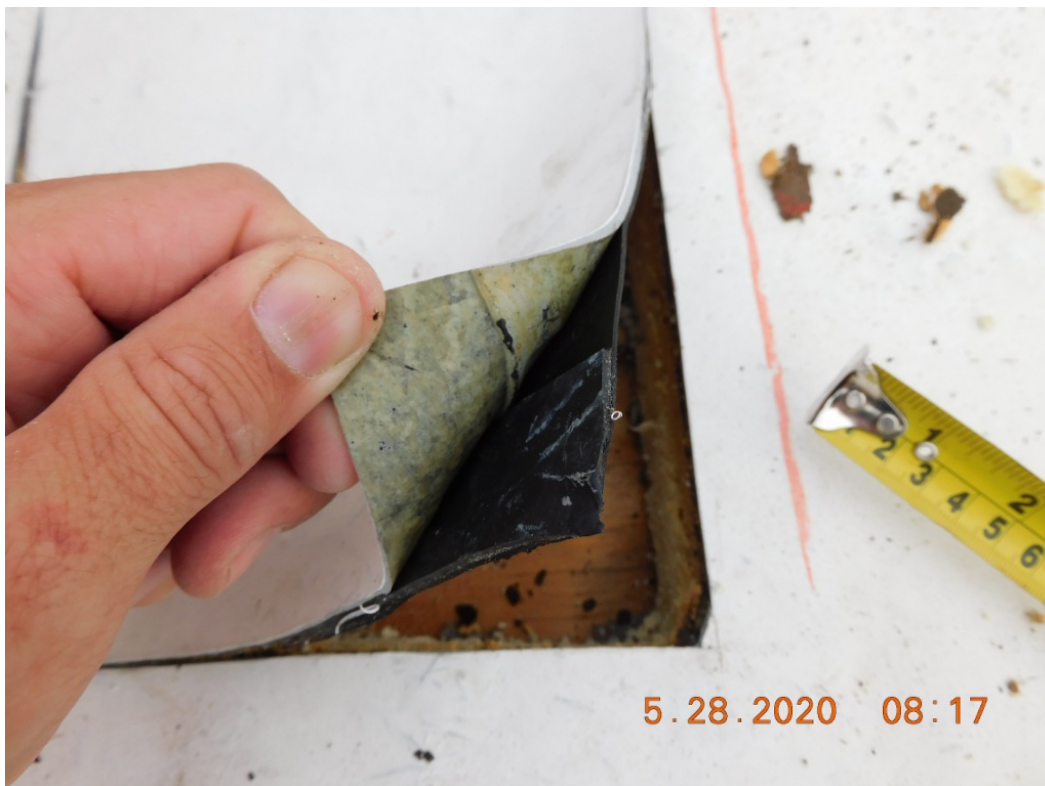


Photo 14

Photograph shows thickness of original roof (EPDM).



Photo 15

Photograph shows thickness of liquid applied roof system. (Includes base coat and top coat)



Photo 16

Observed void in coating installed over original roof assembly along seam.

**See next photo for the presence of moisture trapped in void.



Photo 17

10X View

Lower Roof Section:
Core A

Observed presence of moisture trapped in coating installed over original roof assembly.





Photo 18

Photograph shows single layer of 2" of insulation board.

** City of Coppell code requires R-25 to be installed on new construction and reroofs.



Photo 19

Observed 1" of moisture trapped in top surface of insulation board.

See Diagram above for vapor drive effects.

Photo 20

Photograph shows repair completed at Core A.



Photo 21

Photograph shows Lower Roof Section: Core B dimension.

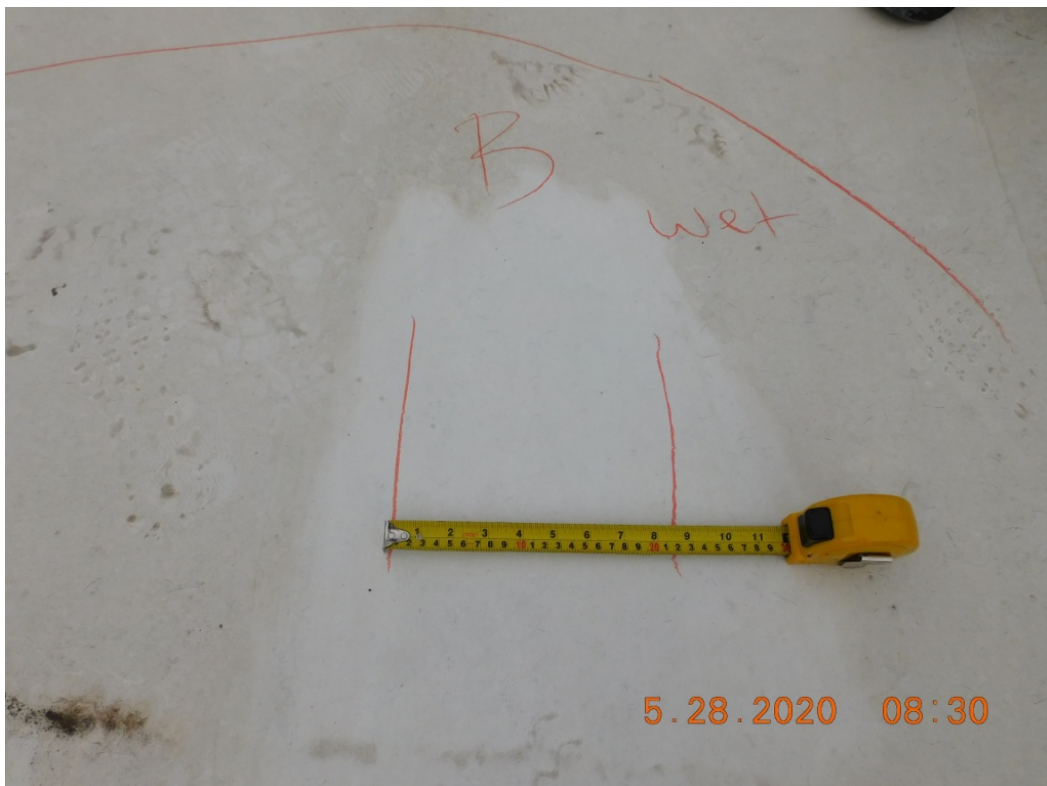


Photo 22

Photograph shows
liquied applied roof
system installed over
original EPDM roof
assembly.



Photo 23

Observed moisture
present on top surface
of insulation board.





Photo 24

Observed moisture damaged on wood deck surface from contraction and expansion of roof deck. (See cracks and old moisture marks)



Photo 25

Observed corroded fastener attaching wood deck to framing members "Rafters" below roof deck.

Photo 26

Diagram shows roof barrier application over wood deck to stop vapor drive and lower condensation levels in roof assembly.

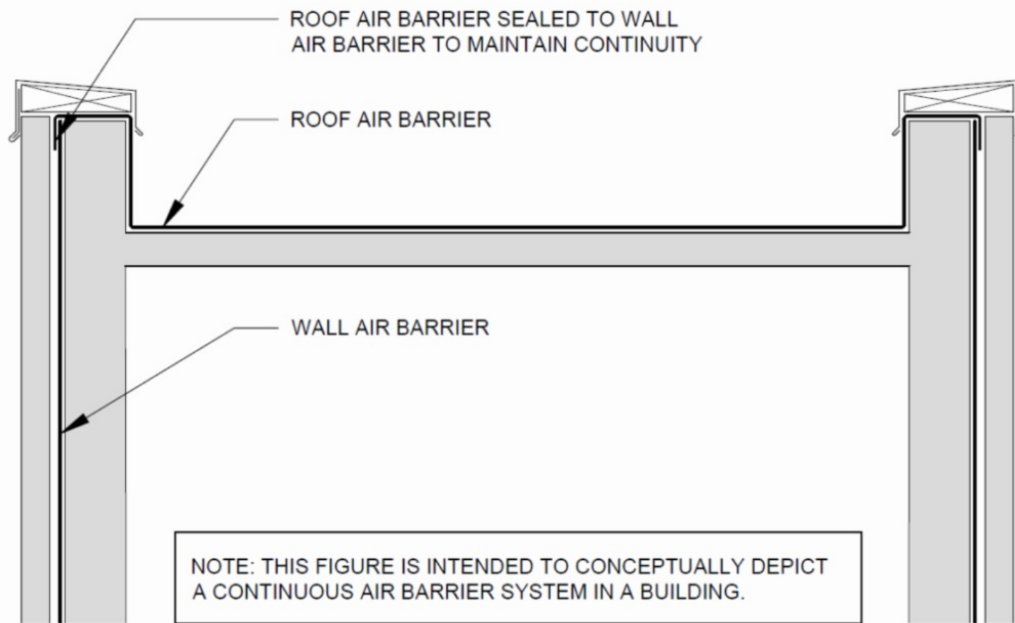


Photo 27

Photograph shows repair made at Lower Roof Section Core B.

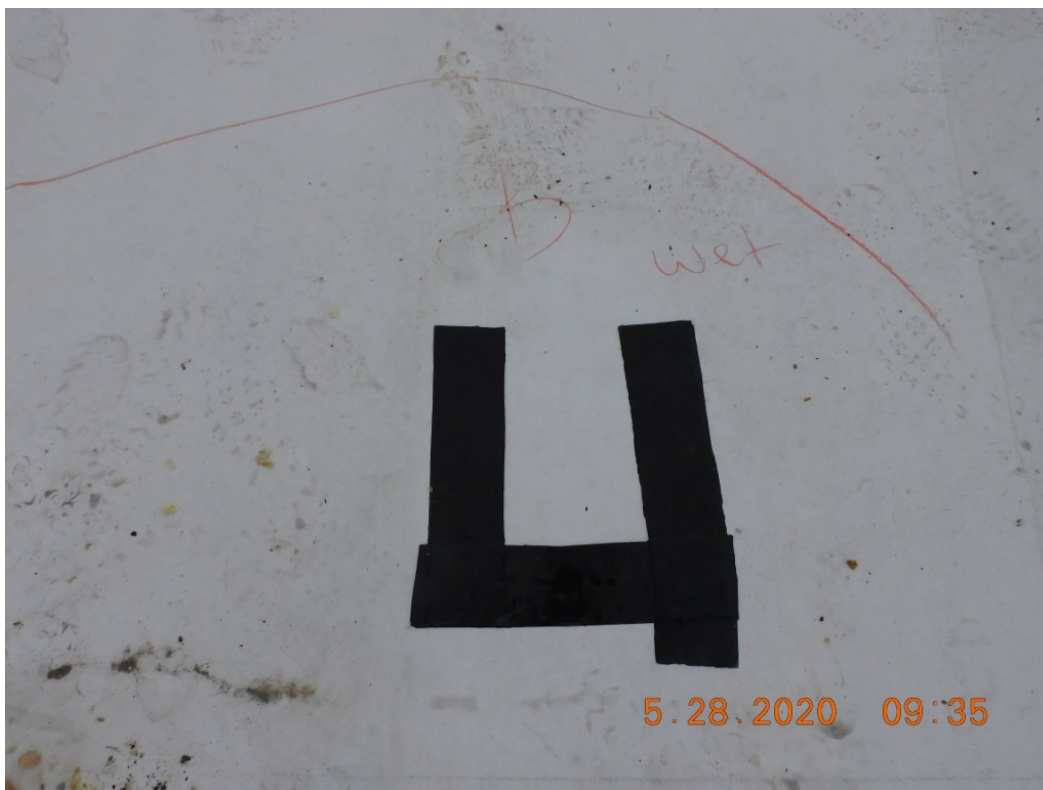


Photo 28

Photograph shows
Lower Roof Section:
Core C dimension.



Photo 29

Photograph shows 100%
reading on Tramex
Model RWS (moisture
detection) in roof
assembly at Core A
location.



Photo 30

Photograph shows close up view of 100% reading on Tramex Model RWS (moisture detection) in roof assembly at Core C location.



Photo 31

Observed corroded fastener and plate.





Photo 32

Photograph shows close up view of rapid galvanic corrosion from moisture trapped in roof assembly.

** Fasteners and Plates are crucial for withstanding wind uplift and maintaining ASTM design requirements during gale force winds and high wind events including tornados, wind bursts, etc.



Photo 33

Photograph shows close up view of corrosion on fastener and plate at Lower Roof Section Core C.

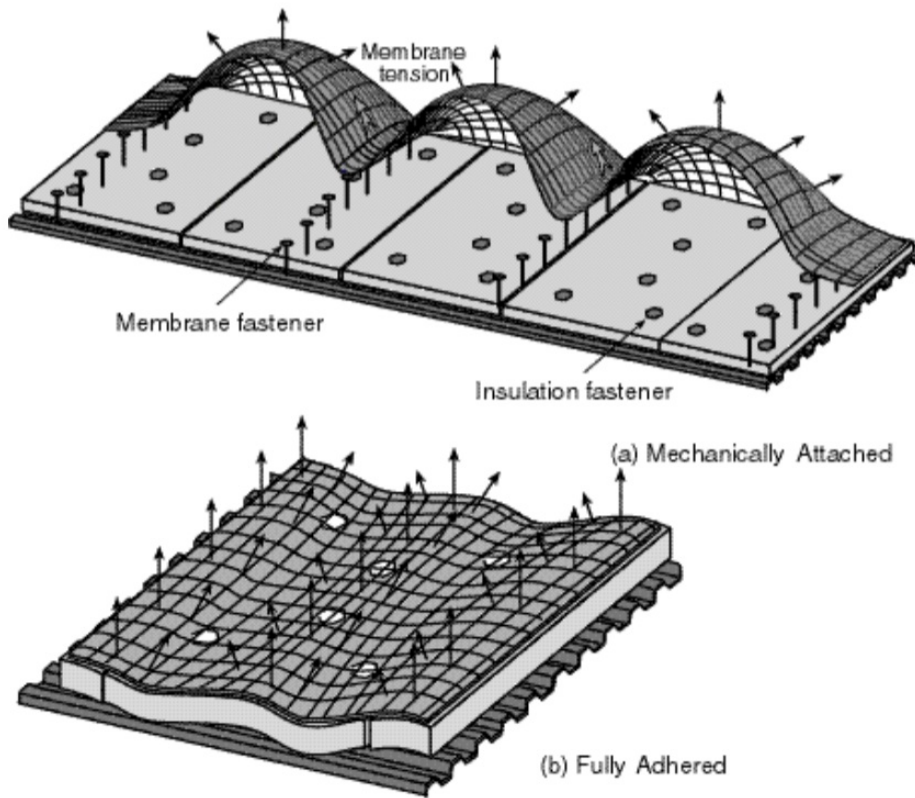


Photo 34

Photograph shows uplift effects of single ply adhered system during high winds, gale force winds and the like.

Pressure differentials transfer load on roof fasteners and plates. Fasteners and plates are the last line of defense for securing roof to structure.



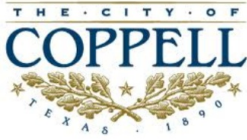
Photo 35

Observed presence of moisture and past moisture damage on insulation board.

Photo 36

Photograph shows repair made at Lower Roof Section Core C.






Solution Options

Client: The City of Coppell

Facility: 265 E Parkway

Roof Section: Low Slope: Lower Roof

Replace Options

Solution Option:	Replace 	Action Year:	2020
Square Footage:	5,198	Expected Life (Years):	30
Budget:	\$96,366.00		

Case #0265-01

Scope of work: See specification below with all requirements concerning mobilization, permits, labor, materials, COVID 19 prevention plan, equipment, toilets, first aid, OSHA and all applicable code requirements adopted by city of coppell.

See Section **01 11 00 Summary of work** for scope of work and requirements.



Client: The City of Coppel

Facility: 265 E Parkway

Roof Section: Low Slope: Upper Roof



Information

Year Installed	N/A	Square Footage	10,894
Slope Dimension	1/4" : 12"	Eave Height	30
Roof Access	Ladder Needed	System Type	Liquid Coating

Assembly

Roof #	Layer Type	Description	Attachment	R-Value	Thickness
1	Surfacing	Reflective	Cold applied	.1	55 Mils
1	Membrane	EPDM	Fully Adhered	-	45 Mils
1	Insulation	Polyisocyanurate	Mechanically attached	12	2"
1	Deck	Plywood	Mechanically attached	1.25	1"

Details

Perimeter Detail	Parapet Wall
Flashing Material	EPDM
Drain System	Internal Roof Drains
Parapet Wall	Brick
Coping Cap	Metal

Inventory	
Inventory Type	Quantity
HVAC	11

Client: The City of Coppel

Facility: 265 E Parkway

Report Date: 05/28/2020

Title: Roof Core Analysis Photographic Report

Roof Section: Low Slope: Upper Roof



Photo 1

Aerial view shows core locations of upper roof section.

Photo 2

Photograph shows
Upper Roof Section Core
D dimension.



Photo 3

Observed corroded
fastener and plate.





Photo 4

Observed moisture trapped in insulation board fastened to wood deck.



Photo 5

Observed presence of moisture in roof deck.

Observed corroded insulation fastener.



Photo 6

Photograph shows close up view of moisture trapped in roof deck.

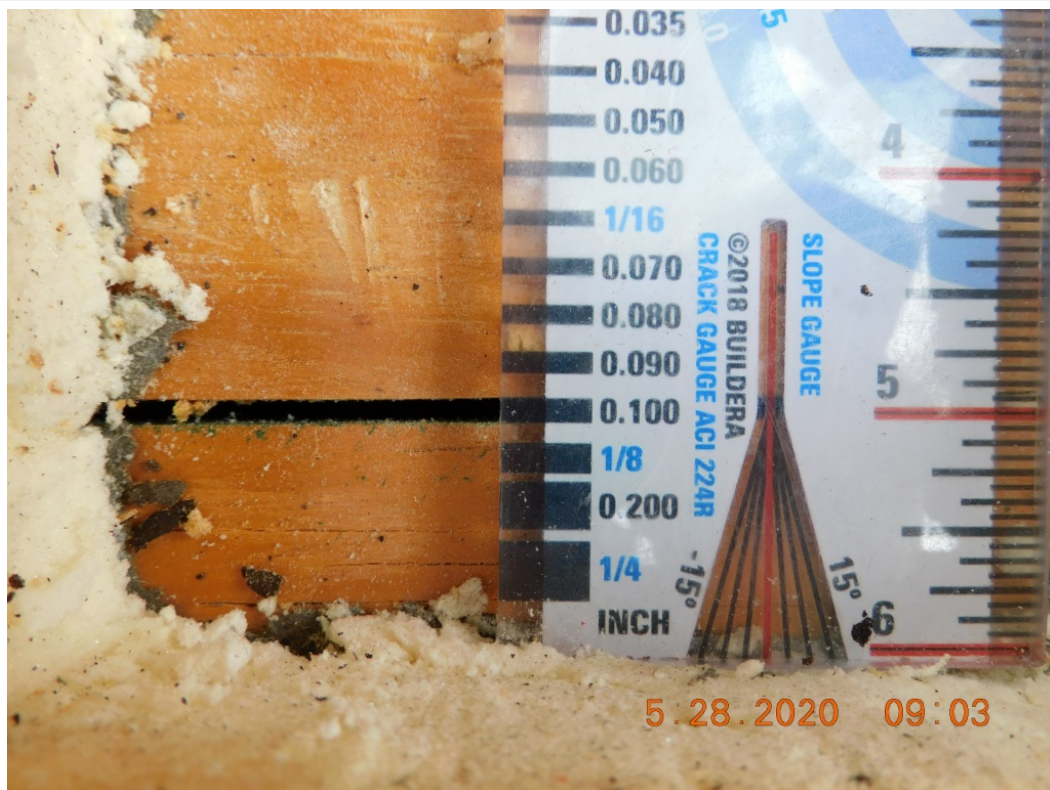


Photo 7

Observed .100" opening between wood decks.

*** During visual inspection cold air from interior of building was continuously migrating out of crack. This air is being trapped in insulation board and transferring to wood deck any time HVAC is active.



Photo 8

Photograph shows inspection tool penetrating 6" into interior of building.

***Observed missing air barrier is allowing cool conditioned air into existing Roof assembly. Air barrier is designed to prohibit transfer of conditioned air into insulation board.

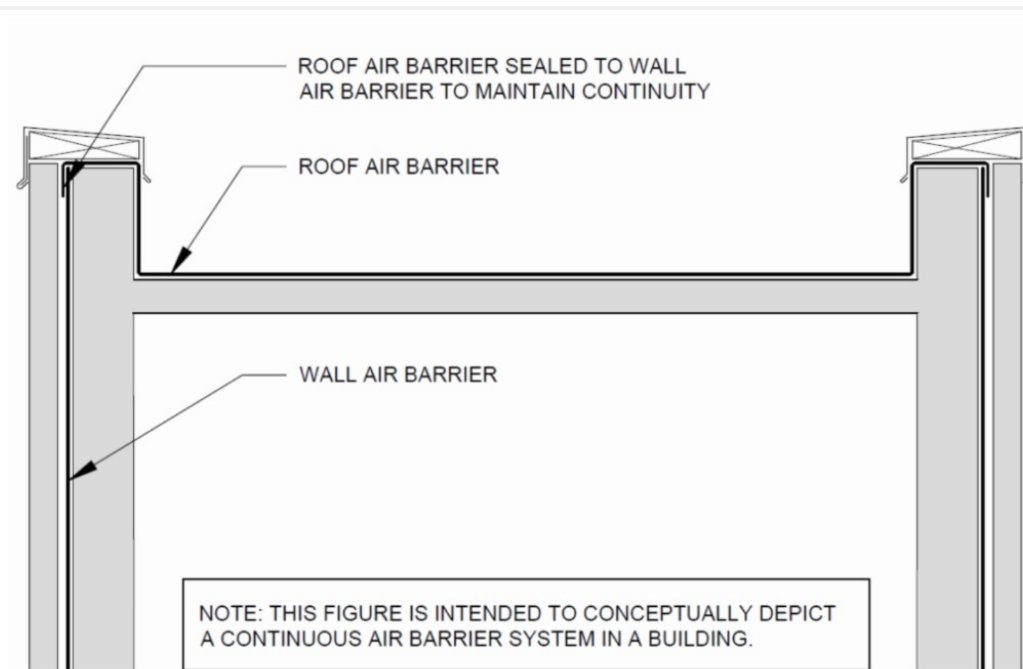


Photo 9

Diagram shows Roof Assembly Vapor Barrier providing separation between conditioned space (Cool / Hot Air) from Roof components.



Photo 10

Photograph shows moisture present in top of insulation board (1").



Photo 11

Observed moisture degradation of insulation board.

Photo 12

Photograph shows moisture present in top of insulation board (1").



Photo 13

Photograph shows moisture present from bottom of insulation board to top of insulation board surface.



Photo 14

Photograph shows repair made at Upper Roof Section Core D.



Photo 15

Photograph shows Upper Roof Section Core E dimension.

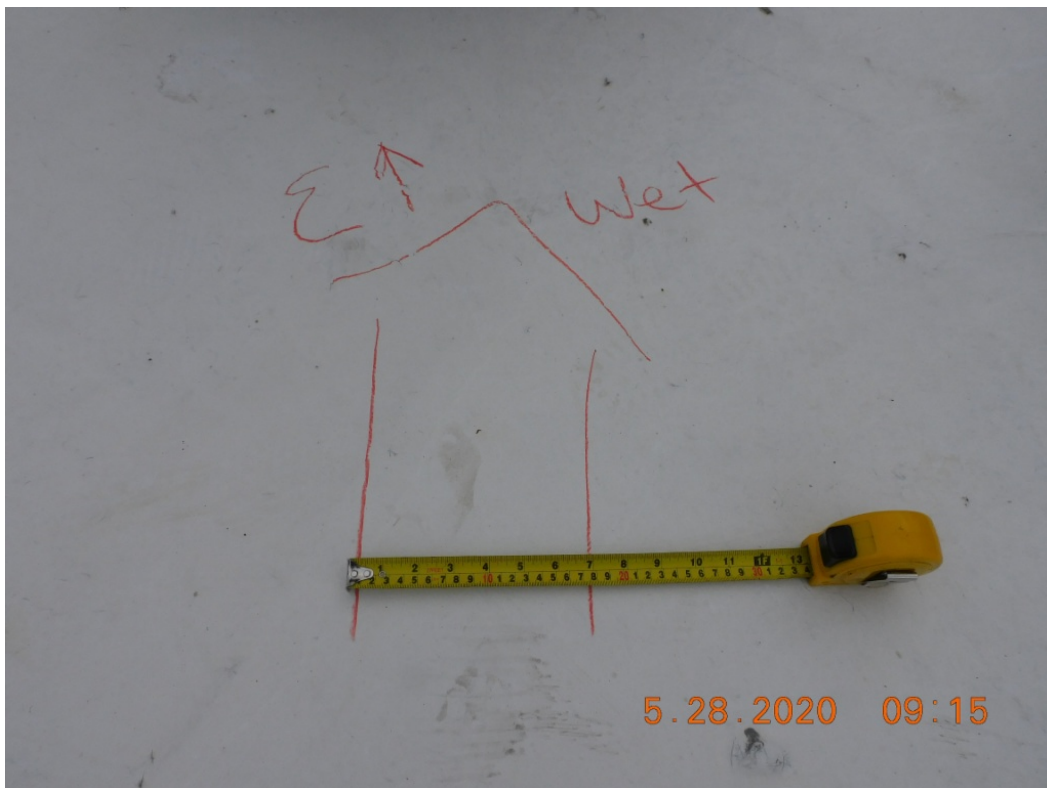


Photo 16

Photograph shows Tramex moisture detection meter at 100% at Upper Roof Core Section E.



Photo 17

Photograph shows close up view of reading (100% Moisture) at Upper Roof Section E Core location.



Photo 18

Observed moisture degradation of insulation facer sheet.

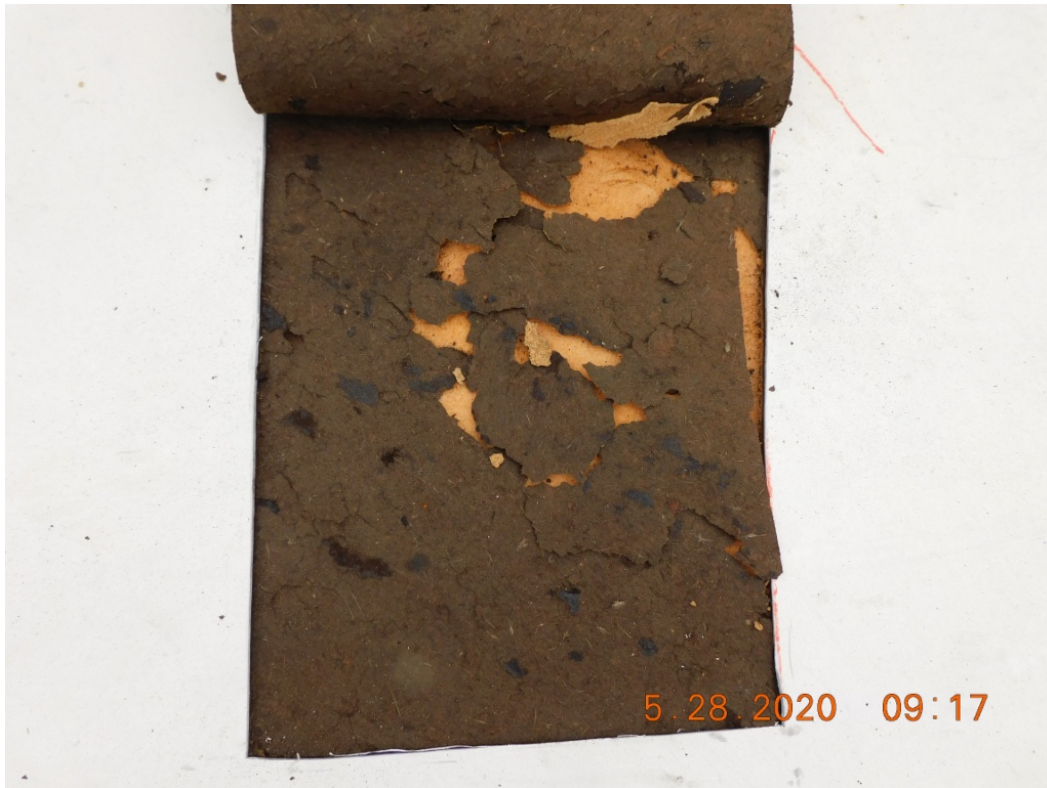


Photo 19

Insulation board facer detached from insulation board from presence of moisture trapped in roof assembly.



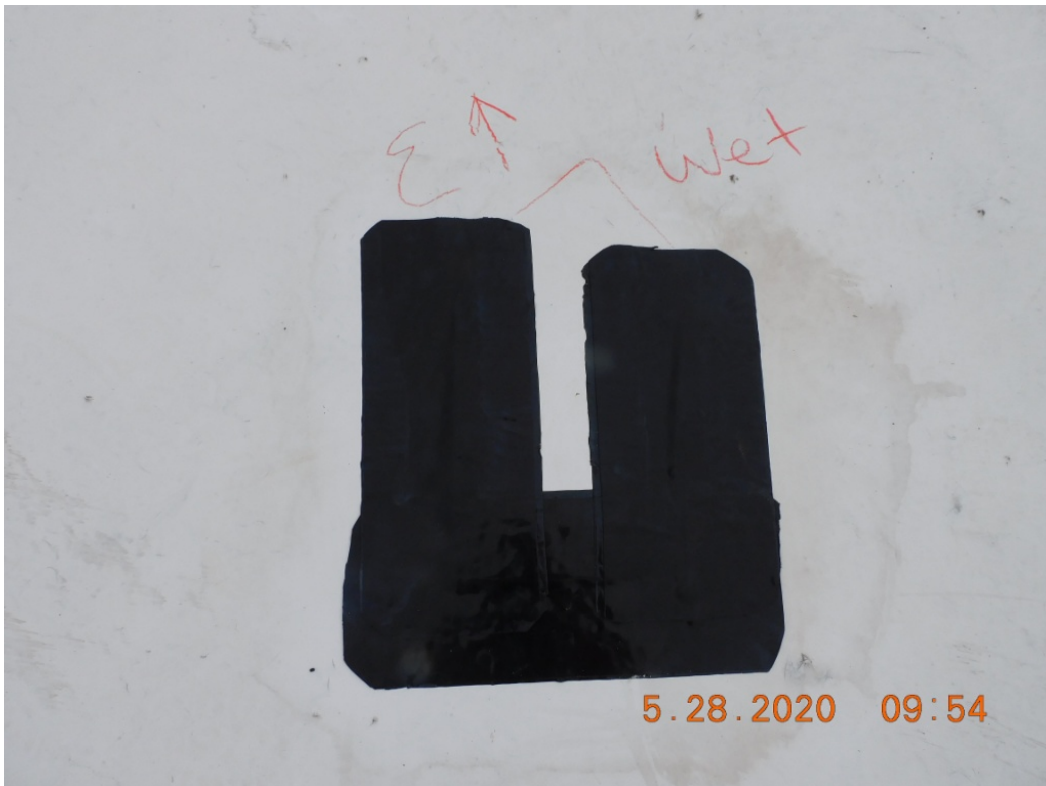
Photo 20

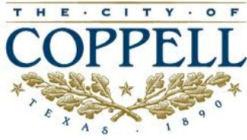
Photograph shows moisture present in top of insulation board (1").



Photo 21

Photograph shows repair made at Upper Roof Section Core E.






Solution Options

Client: The City of Coppell

Facility: 265 E Parkway

Roof Section: Low Slope: Upper Roof

Replace Options

Solution Option:	Replace 	Action Year:	2020
Square Footage:	10,894	Expected Life (Years):	30
Budget:	\$202,956.00		

Case #0265-01

Scope of work: See specification below with all requirements concerning mobilization, permits, labor, materials, COVID 19 prevention plan, equipment, toilets, first aid, OSHA and all applicable code requirements adopted by city of coppell.

See Section **01 11 00 Summary of work** for scope of work and requirements.

SECTION 01 11 00

SUMMARY OF WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS – 265 E Parkway Blvd. Emergency Roof Replacement

- A. Attached GENERAL CONDITIONS, BID FORM, Component sections, forms a component part of this section.
1. Remove existing metal roof down to existing roof deck(wood).
 2. Replace or repair deck as needed to ensure structural integrity. Build new curbs for units that are improperly supported.
 3. Install **VAPOR BARRIER** over wood deck for moisture barrier.
 4. Mechanically attach 2 layers of 2.2" ISO board insulation per wind uplift calculation.
 5. Adhere ½" coverboard mechanically fastened to roof deck..
 6. Install additional pressure treated wood nailers to match insulation height.
 7. Install 4" fiberglass cant at rise walls and curbs set in mastic.
 8. Install SBS modified 80 mil base ply extending over edge cold applied.
 9. Install SBS modified mineral cap sheet in Weatherking (3 Gallons per Square).
 10. Prime substrate and allow to dry then install 80 mil SBS modified flashing base ply in flashing adhesive.
 11. Install SBS modified mineral cap flashing ply in flashing adhesive.
 12. Three course all flashing laps with aluminized mastic and mesh
 13. Terminate all field plies 2" above cant. Terminate all flashing plies minimum 10" above roof surface. Extend curb flashing over top of curbs.
 14. Extend flashing base ply 6" onto field of roof and flashing cap ply 9" onto field of roof.
 15. Install termination bar attached with fasteners at minimum 8" on center and three-course with flashing mastic and mesh reinforcement.
 16. Fabricate and install prefinished 24 ga. counterflashing on rise walls fastened 6" o.c.
 17. Install new 4 lb. lead to drain pans, plumbing vent flashings and heat stack storm collars. Prime both sides of flange and set in mastic over field plies. Strip in with base and cap adhered with flashing mastic.
 18. Paint gas lines safety yellow.
 19. General Contractor/Roofing to provide 5 Year workmanship warranty.
 20. General Contractor/Roofing Contractor to provide 1st Year of maintenance.

1.2 INTENT OF THE SPECIFICATIONS

- A. The intent of these specifications is to describe the material and methods of construction required for the performance of the work. In general, it is intended that the drawings shall delineate the detailed extent of the work. When there is a discrepancy between drawings, referenced specifications, and standards and this specification, this specification shall govern.

1.3 PROTECTION

- A. The contractor shall use every available precaution to provide for the safety of the property owner, visitors to the site, and all connected with the work under the Contract.
- B. All existing facilities both above and below ground shall be protected and maintained free of damage. Existing facilities shall remain operating during the period of construction unless otherwise permitted. All access roadways must remain open to traffic unless otherwise permitted.
- C. Barricades shall be erected to fence off all construction areas from operations personnel.
- D. Safety Requirements:

SECTION 01 11 00

SUMMARY OF WORK

1. All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
2. Comply with federal, state, and local and owner fire and safety requirements.
3. Advise owner whenever work is expected to be hazardous to owner employees and/or operations.
4. Maintain a crewman as a floor guard whenever roof decking is being repaired or replaced and whenever any roofing is being removed.
5. Maintain proper fire extinguisher within easy access whenever power tools, roofing kettles, and torches are being used.
6. ALL SAFETY REQUIREMENTS OF THE BUILDING OWNER MUST BE FOLLOWED. NO EXCEPTIONS WILL BE PERMITTED.

1.4 HOUSEKEEPING

- A. Keep materials neat and orderly.
- B. Remove scrap, waste and debris from project area.
- C. Maintenance of clean conditions while work is in progress and cleanup when work is completed shall be in strict accordance with the "General Conditions" of this contract.
- D. Fire protection during construction.
- E. Follow all requirements established by the building owner.

END OF SECTION