

AIA Learning Credits: 1.5 LU/HSW RAiNA AIA Provider #: 502111378 Course #: RAiNAsymp24_3

Case Study: INOVA Loudoun Hospital From Conception to Completion

Ankur Deshpande - HDR Jason Beshore - HDR Gabriel Castillo - Pillar Louay Ghaziri - DPR Thilo Wilhelmsen - DPR



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Agenda

1. Introductions

- Objectives
- Bios

2. Design intent

- History of county and campus
- Design & Facade System Evolution
- Final Façade Selection
- Performance Analysis

3. Pricing

• VE & Buy-out Process

4. Coordination

- Constructability
- Mock-up

5. QA/QC

- DFOW
- Performance QC
- 6. Maintenance and Operation

Abstract

Durability, resiliency, materiality and sustainability were just a few of the design goals of the façade for the 9 story (380,000 SF) new patient tower at the Inova Hospital in Loudoun County, Virginia.

The exterior wall assembly, separating the outdoor environment from the indoor conditioned space, is one of the most critical performance components of any hospital building, helping ensure the health, well-being and safety of patients and staff. This program will dive into the story of the exterior rainscreen wall assembly on a Hospital Tower, unpacking how it was selected for the building and executed to meet the project goals

Learning Objectives

- 1. Learn about the role of the architect, manufacturer, wall consultant, installer and general contractors pay in the overall project life.
- 2. Understand the project cycle from conception to completion.
- Present a successful outcome of collaboration over a complete project life cycle.

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Presenter Bio

Jason has over 25 years of experience in design and construction, particularly in healthcare facilities. He has a diverse background in healthcare planning, operations, project management, architecture, research, and client relations. He is known for his strong advocacy for clients and a collaborative approach to teamwork and expertise. Throughout the lifecycle of a project, he remains actively engaged and ensures effective communication between the client, design team, and construction managers. Jason also supports research and product design with our clients to help them achieve the goals of integrated research design and translating evidence into design practice.

Jason Beshore

Principal, Health / Associate Vice President HDR Architecture Inc.

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Ankur Deshpande

AIA . NCARB . LEED A.P. BD+C Associate. Senior Project Architect *HDR Architecture Inc.*

Presenter Bio

Ankur has been with HDR'S Mid Atlantic Practice as a Senior project Architect for more than 20 years. He has extensive experience in federal and private sector projects related to healthcare design, science & technology and is well versed with construction documentation process. He leads multidisciplinary teams and oversees projects from the schematic design phase through construction administration while keeping the team on schedule and budget. In the field of Building envelopes, he brings technical excellence and familiarity with current design trends especially in the field of rainscreens. He works closely with Architectural designers to integrate construction technics to detail a high performance envelope.

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Gabriel Castillo

Rainscreen Facades Building Envelope Specialist *Pillar Construction*

Presenter Bio

With vast experience in construction, Gabriel passionately combines design principles and ingenuity to support design professionals and General Contractors. He is an architect and civil engineer that looks for aesthetics and buildable solutions. Castillo has been involved in the design, engineering, and installation of rainscreen façades for decades. He believes professional collaboration produces valuable results.

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Louay Ghaziri

Superintendent DPR Construction

Presenter Bio

Louay is an experienced superintendent at DPR construction. Prior to starting his professional career, Louay obtained his Bachelors of Architecture from the Lebanese American University in Beirut. He then obtained a Masters of Science in Building Construction and Facilities Management from the Georgia Institute of Technology. This allowed him to pivot from architecture into construction. Louay is currently pursuing his MBA at Georgetown University with a focus in Global Real Estate.

Throughout his 8 years at DPR, he has successfully completed projects in various core markets such as, healthcare, advanced tech, commercial, and life sciences. One highlight project was the INOVA Loudoun Hospital North Patient Tower, a 385,000 square-foot state-of-the-art patient tower where he led the façade and structural systems coordination. Another major project involved leading the planning and general field coordination of a mixed-use repositioning project at 20 Mass Ave that involved a hotel and class A trophy office in downtown DC. He enjoys experimenting with new construction technology and out of the box approach to delivering efficient and quality projects.

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Thilo Wilhelmsen

Exterior Envelope SME DPR Construction

Presenter Bio

Thilo spent most of his 30+ year construction industry career focusing on highly complex exterior envelope systems. Prior to joining DPR as their Exterior Skin Expert, Thilo worked for international facade contractors on some of the largest and complex building envelopes throughout North America and Europe.

His experience includes many ground-up core and shell projects in the commercial, higher education, healthcare, hospitality, transportation, and retail markets.

Since becoming a member of DPR's team, Thilo has been leading the exterior envelope preconstruction and design assist phases on some of the company's target projects nationwide. He has also been instrumental in developing DPR's prefabricated, exterior wall panel applications. Through DPR's own prefabrication subsidiary, Thilo has successfully incorporated the advantages of this construction approach into many of DPR's ground-up projects throughout the country.

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About the Project Inova Health System Loudoun Hospital Campus

INOVA Health System

Mission is to Provide World-class Healthcare – every time, every touch – to each person in every community we have the privilege to serve

- 2nd Largest Provider of Healthcare in the Commonwealth
- 1800 Licensed Patient Beds
- Integrated network of Hospitals, Primary & Specialty Care, Emergency Urgent Care, Outpatient
- Destination Institutes: Heart & Vascular, Schar Cancer, Neuroscience & Spine
- Northern VA's only Level 1 Trauma Center, Level 4 Neonatal ICU

1956	5	18K	2M
Year founded	Hospitals	Number of Employees	Number of individuals served annually

INOVA LOUDOUN HOSPITAL

MARKET ANALYSIS

Loudoun County Demographics

Sources: Advisory Board, 5g2. Truven Health Analytics, Claritas, Virgina Hospital Association and HDR Analytics.



Loudoun County projected population (2024): +500k OB department projection (2024): 3,000 Births *Designed to accommodate +4000 Births Current Length of Stay (Vaginal delivery): 1.8 days Current Length of Stay (C-section): 3.6 days

UTILIZATION GROWTH

POPULATION GROWTH

TOTAL GROWTH

HDR, INC + 1101 KING STREET, SUITE 400 ALEXANDRIA, VIRGINIA 22314 + 703.518.8500

SINOVA HR

LANSDOWNE DESIGN GUIDELINES

LOUDOUN COUNTY ZONING



Concrete Panel Rain Screen System



Field Stone Base Wall Material



High-Performance Insulating Glazing System with Low-Iron Glass

Metal Panel Wall, Louver, and Soffit System





*REQUEST VARIANCE OF 1'-0" FOR PENTHOUSE *REQUEST VARIANCE OF 6'-0" FOR BUILDING

INOVA LOUDOUN HOSPITAL

INOVA LOUDOUN HOSPITAL • 44045 RIVERSIDE PARKWAY, LEESBURG, VIRGINIA 20176

BUILDING HEIGHT INFORMATION

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hdrinc.com

Inova Health System Loudoun Hospital Campus

Leesburg, VA

- \$300M master plan expansion
 - 382,000-sq.-ft. new patient tower
 - Central energy plant
 - Parking Garage
 - Site infrastructure
- Scheduled completion 2020
- First patient April 2020
- Located in Loudoun County Virginia

About the Project

Inova Health System Loudoun Hospital Campus







Project Information

382,000 Total GSF 276,000 Fit Out 106,000 Core & Shell

228 Total Planned Beds

24 NICU Beds 12 LDR Beds 36 Postpartum / Antepartum / Observation Beds 60 Med / Surg Beds 96 Future Med/Surg Beds



Pedestrian Bridge

P

B

1



Basement Incoming Electric, Fire Pump, Water Service







2nd Floor 2 24 NICU Beds 10 Prep & Recovery Rooms 5 C-Section 12 LDR Rooms





5th Floor 48 Med / Surg Rooms





F

3rd Floor Satellite Kitchen

3

6th & 7th Floors Core & Shell (48 per floor future Med / Surg Rooms)



4th Floor 4 36 Postpartum / Antepartum

5

12 Med/Surg

PROGRAMMATIC STACKING







BIRTHING CENTER PROJECT



INOVA Loudoun campus exhibits a combination of following exterior materials

- BRICK
- PRECAST + CURTAIN WALL

Campus Vocabulary

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RAINA RAINSCREEN ASSOCIATION IN NORTH AMERICA



<image>

NEW LOADING DOCK AND CENTRAL KITCHEN

MOB BUILDING

INOVA Loudoun campus exhibits a combination of following exterior materials

- DECORATIVE CMU
- METAL PANEL
- STUCCO



Cladding evaluation

Based on exhaustive selection process for the Key patient room type and the Race track Service core model, the healthcare layout was finalized. This was coordinated with the Structural design to have 12'-0" cantilevered bays on the long edges of the footprint.

Following materials were identified in an effort to harmonize with the existing campus pallete

BRICK RAINSCREEN Was deemed traditional and a more contemporary aesthetic was preferred.

- INSULATED PRECAST SYSTEM
- Was found to be Structurally intensive option that would have affected the layout and burdened the foundations. Lacked advantages of a high performance envelope provided by a rainscreen system.
- FIBER CEMENT BOARD RAINSCREEN SYSTEM
- Was not preferred due to a more smooth finish and lack of texture.
- UHPC LARGE FORMAT RAINSCREEN SYSTEM
- Satisfied the feel of texture, aggregate mix to match the precast garage finish. It was found to be acceptable for lighter cladding burden with rainscreen advantages.



Why Rainscreen

Hospitals are designed are energy intensive buildings that are built with a minimum life of 50 years.

That is why, Modern hospitals

- Prefer a high performing envelope.
- May consider an exterior cladding replacement over the life of the facility
- Are built to sustain against elements and need the ability to regularly maintain the façade.

Because of some of these challenges, a smart envelope must ensure

- Effective weatherproofing Protected and drained Air vapor barrier.
- Effective Insulation Ventilated continuous insulation that tempers the transmission of temperature across the exterior skin section.
- Thermal break Cladding support system with an effective way of not shorting the Thermal gradient
- Maintenance friendly Assist with the removal of the cladding system to fix leaks or replace elements of a cladding system.
- Non sequential installation provides each panel to be removed independently of each other
- Skin economics Provide an economical, modular layout that complements the design, construction and replacement.



Rainscreen concepts

A rainscreen should be viewed as a building envelope support mechanism, whose primary function is not to provide barrier protection against water penetration (such as a weather-resistant barrier does). Rather, a rainscreen is **designed to limit the amount of water** that could potentially come into contact with the primary building envelope's moisture barrier, thereby reducing the chance of water finding a way into the wall assembly. - <u>https://knightwallsystems.com/what-is-a-rainscreen/</u>

Rainscreen are generally designed as

Pressure equalized rainscreen systems Testing : AAMA 508-07



P_ = Pressure Exterior

P_c = Pressure Cavity

essure Equalized / Pressure Moderated No water reaches the AWB Barrier.

 Yentilated rainscreen systems

 Testing : AAMA 509-09

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RAINA RAINSCREEN ASSOCIATION

P. = Pressure Exterior

P, = Pressure Interio

Diagrams courtesy : https://rainscreeninfo.com/rainscreen-design-basics/



IECC 2012

TABLE C402.2

OPAQUE THERMAL ENVELOPE REQUIREMENTS^a

CUMATE TONE		1		2		3	4 EXCEPT	T MARINE	5 AND N	MARINE 4		6		7		8	
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Insulation entirely above deck	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-25ci	R-25ci	R-25ci	R-25ci	R-30ci	R-30ci	R-35ci	R-35ci	R-35ci	R-35ci	
Metal buildings (with R-5 thermal	R-19 +	R-19 +		R-19 +	R-19 +	R-19 +	R-19 +	R-19 +	R-19 +	R-19 +	R-25 +	R-25 +	R-30 +	R-30 +	R-30 +	R-30 +	
blocks) ^{a, b}	R-11 LS	R-11 LS	R-19 + R11 LS	R-11 L5	R-11 LS	R-11 LS	R-11 LS	R-11 LS	R-11 LS	R-11 LS	R-11 LS	R-11 LS	R-11 LS	R-11 LS	R-11 LS	R-11 LS	
Attic and other	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-49	R-49	R-49	R-49	R-49	R-49	R-49	
	•						Walls, A	bove Grade									
Mass	R-5.7ci	R-5.7ci	R-5.7ci	R-7.6ci	R-7.6ci	R-9.5ci	R-9.5ci	R-11.4ci	R-11.4ci	R-13.3ci	R-13.3ci	R-15.2ci	R-15.2ci	R-15.2ci	R-25ci	R-25ci	
Motal building	R-13+	R-13 +	R13 +	R-13 +	R-13 +	R-13 +	R-13 +	R-13 +	R-13 +	R-13 +	R-13 +	R-13 +	R-13 +	R-13+	R-13 +	R-13+	
Metal building	R-6.5ci	R-6.5ci	R-6.5ci	R-13ci	R-6.5ci	R-13ci	R-13ci	R-13ci	R-13ci	R-13ci	R-13ci	R-13ci	R-13ci	R-19.5ci	R-13ci	R-19.5ci	
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Metal framed	R-5ci	R-5ci	R-5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-15.6ci	R-7.5ci	R-13+ K17.30	
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wood framed and other	R-3.8ci or R-20	R-3.8ci or R-20	R-3.8ci or R-20	R-3.8ci or R-20	+	+	+	+	+	10ci	10ci						
											R-3.8ci	R-3.8ci	R-3.8ci	R-3.8ci	R-3.8ci	TUCI	TUCI
							Walls, B	elow Grade									
Below-grade wall ^d	NR	NR	NR	NR	NR	NR	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-10ci	R-10ci	R-10ci	R-12.5ci	
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Mass	NR	NR	R-6.3ci	R-8.3ci	R-10ci	R-10ci	R-10ci	R-10.4ci	R-10ci	R-12.5ci	R-12.5ci	R-12.5ci	R-15ci	R-16.7ci	R-15ci	R-16.7ci	
Joist/framing	NR	NR	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30 ^e	R-30 ^e	R-30 ^e	R-30 ^e	R-30 ^e	
							Slab-on-G	Floors									
Upheated slabs	ND	ND	ND	ND	ND	ND	R-10 for 24"	R-10 for 24'	R-10 for 24'	R-10 for 24'	R-10 for 24"	R-15 for 24'	R-15 for 24'	R-15 for 24'	D 15 for 34" holow	B 20 for 24" holow	
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Lipstod clabed	R-7.5 for 12'	R-7.5 for 12'	R-7.5 for 12'	R-7.5 for 12'	R-10 for 24'	R-10 for 24"	R-15 for 24'	R-15 for 24'	R-15 for 36'	R-15 for 36"	R-15 for 36'	R-20 for 48'	R-20 for 24'	R-20 for 48'	B 20 for 40' holow	D 20 for 48' holew	
Heated slabs	below	below	below	below	below	below below	below	below	below	below	below	below	below	below	R-2010146 Delow	R-20101 46 Delow	
							Opaq	e Doors									
Swinging	U-0.61	U-0.61	U-0.61	U-0.61	U-0.61	U-0.61	U-0.61	U-0.61	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	
Roll-up or sliding	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	

THERMAL ENVELOPE TARGET VALUES USED FOR PROJECT

Insulation entirely above deck : Metal framed (Rainscreen locations): Below-grade wall : R-30 c.i. **R-3 + R-18 c.i.** R-10 c.i.

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Cladding re-selection

Just prior to the Permitting set, based on further discussions with DPR and the client, a Cladding update was necessary pursuant to

- VE effort
- Material characteristics
- Installation logistics

This effort was completed in design within a period of **3** weeks.





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Final cladding solution



Final cladding solution



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The bedtower's building facade was finally comprised of

- Terracotta rainscreen wall system to • harmonize with the texture of existing Precast, DCMU, Brick systems
- Metal Panel rainscreen wall system .
- **Curtain wall assembly**

Aluminum Metal Panel Walls, Screens & Soffits Terracotta Rainscreen Wall System Insulated Glass Panel & Anodized Aluminum Frame Translucent Canopy Panel Terracotta Rainscreen Wall System Natural Stone From Existing Hospital





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Rainscreen Assembly



TERRACOTTA RAINSCREEN ASSEMBLY

Thermal anchor

METAL PANEL RAINSCREEN ASSEMBLY



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Typical Details at Terracotta

TYPICAL OUTSIDE CORNER

TYPICAL PARAPET DETAIL





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Typical Details at Terracotta

CURTAINWALL EDGE DETAILING





Transition Details at Terracotta





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8

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GC RFP & Procurement

- DPR hard bid against other GCs
- RFP submission in May 2017 with "Perfect Drawing Set"
- Award June 2017
- Things Changed (Rainscreen-wise)!





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Material Matrix

Solid Wall & Rainscreen Façade Optio	ns	DPR	
Michaeckard Freed 21 5 8700 Architektrard Prevait 21 5 8700 Architektrard Prevait 21 5 600 Marchitektrard Prevait 21 5 600 Architektrard Prevait 21 5 600 Contemport Prevaits training on threadure 21 5 800 Screamer Hexading on Workshop 21 5 200 Typesm Stift 5 46.00	That & Kansureen	Manufacturen Artas par Carso Tendal Metramon//MoliNy	
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DPR	Solid Wall & Rainscreen Façade Options Ac	DPR	Glass a 02/11/201	nd Glazing Façade Options a	DPR	
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Cladding Options

Inova Loud	oun						
Cladding	Options				08/18/2017		
Note that a	all other condition	is are unchanged (Cavity dep	oth, insulation etc.)				
	Product	Manufacturer	Best Price	Variance	Panel Size	Finish	System Weight
Base Bid	UHPC	Manufacturer	\$5,056,761	N/A	Bid Drawings	Specified	7 - 8 lbs/sf
Alt #1	UHPC	Manufacturer 1	\$4,995,320	(\$61,441)	Bid Drawings	Sandblasted	7 - 8 lbs/sf
Alt #2	UHPC	Manufacturer 1	\$4,842,120	(\$214,641)	2' x 6'	Sandblasted	7 - 8 lbs/sf
Alt #3	Terracotta	Manufacturer 2	\$5,331,000	\$274,239	2' x 6'	Wire Cut	11 - 12lbs/sf
Alt #4	Terracotta	Manufacturer 2	\$4,750,000	(\$306,761)	2' x 4'	Sandblasted	11 - 12lbs/sf
Alt #5	Terracotta	Manufacturer 3	\$4,397,200	(\$659,561)	2' x 6'	Wire Struck	11 - 12lbs/sf
Alt #6	Terracotta	Manufacturer 3	\$5,332,000	\$275,239	2' x 6'	Sandblasted	11 - 12lbs/sf
Alt #7	Terracotta	Manufacturer 4	TBD	TBD	2' x 6'	TBD	15lbs/sf
Alt #8	Terracotta	Manufacturer 5	\$3,920,021	(\$1,136,740)	2' x 6'		7 - 8 lbs/sf
Alt #9	Metal Panel	Overly or Sim.	\$4,650,000	(\$406,761)	2' x 6'	Painted	

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Exterior Skin VE

Skin VE Slide	Curtainwall / Glazing	Metal Panels	UHPC Panels
Specific VE Options	Clear ILO Low Iron Alternate IGU Supplier	Alternate Pohl Product Alternate Manufacturer ILO Pohl	Reduce Panel Thickness
	Work S	essions / Design Assist with Subcontr	ractors
Target Value Strategies	Reduce Sunshade Depth Trims and Closures Alternate System Details/Vendors	Change Panel Sizing / Reduce Anchors ACM ILO Pohl Panels	Review Returns vs Break Metal FibreC or alternate product

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Exterior Skin VE

Final

VE Log

INOVA LOUDOUN HOSPITAL PATIENT TOWER VALUE ENGINEERING DETABLED LOG Detext. Thereby, August 21, 2017 DPR TATIST Name AURIT Comments -BASS Comments ADALT Summeries Inexest in Basemonter Alternate Dec By -31 I v. 1 THE REPORT OF THE PARTY OF THE PARTY OF THE 4 ----re vol alder H littlerdari, #1 Immire, itse W to a \$2-side. The product second street * 4 4 * ~ -Street & or \$100mer prices of \$200.00 on as lines of states a 41 4 the summer of the summer 4 4 w. 10110-0 to spillers drawings and spices CH is update descript and passes 4 inite. d. ... int set. Free ×. in and . THE IS ADDRESS ADDRESS AND ADDRESS. F CRAME -101.000 ×. hang. r perge 'to pace' 4 4 in inc theory page may be also be ~ ~ Dysel, KIT, R. H. 4 4 Dynam, ACT, MC, Hospiel . 10 J 20 gauge of 30 (of 2000 2) gauge of 40 (H to serve us -~ 1 HINT, MINT, MINT ÷ 4 ----4 * 4,000 10 23 19 20 20 14,00

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Trade Partner Selection

Bid Forms

Approntice 5. UNIT PRICES:

The Unit Prices listed below include all labor, material, equipment, overhead, profit and any other costs required to perform the work described and shall be used to calculate the Subcontract Price adjustment for all changes in the work performed under a Unit Price compensation basis. UNIT PRICE # UNIT PRICE DESCRIPTION

	ATTACHMENT 2
COMMERCI	AL TERMS AND SCOPE OF WORK
TO THE SUBC	CONTRACT AGREEMENT BETWEEN
DPP CONSTRI	ICTION A GENERAL PARTNERSHIP

AND SUBCONTRACTOR NAME SUBCONTRACT NUMBER XXXXXXXX

	SCOPE:	TERRACOTTA RAINSCREEN WALL PANELS
ILH North F	Patient To	wer
44017 Rive	rside Parl	way, Leesburg, VA 20176
DPR Job #:	D4-A170	28

This Attachment is incorporated into the Agreement and further clarifies specific Sections of the above referenced Subcontract Agreement between the parties.

A. COMMERCIAL TERMS:

1. SUBCONTRACTOR PRICE BREAKDOWN:

The following schedule of values further clarifies how the Subcontract Price was calculated and, if approved by the Owner, may also serve as the schedule of values breakdown required for processing payments in accordance with Section 4 of the Subcontract Agreement between the parties.

TENS	CODE	DESCRIPTION	\$ AMOUN
1		Terracetta Panels, Insulation, and Cladding Support Bystem	
		TOTAL 5	
	See	Subcontract Section 3.2 for Subcontract Price.	

2. ALTERNATES:

The Alternates listed below reflect scopes of work changes and the corre-

sponding lump sum dollar amount adjustments that, at DPR's sole discretion, may be used to adjust the Subcontract Scope and Price. These dollar

to provide all of the TERRACOTIA RAINSCREEN WALL PANELS required	
by the Contract Documents except as clarified in paragraphs B.2 or B.3 below.	
1. SPECIFICATION SECTIONS:	

iding Support Sy erracotta Rainscreen Wall Pan uid Applied Air Barrier – Vapo

** As it applies to this trades work - Contractor responsible to review all addendum issued specification revisions

8. KEY PERSONNEL:

The list of Key Personnel who are assigned to this project pursuant to Subcontract Section 13.1 is provided below. PERSONNEL ROLE

9. MINORITY BUSINESS ENTERPRISE:

The following subcontract work will be performed by Minority Business En-

amounts include all overhead and profit markups allowed by the Subcon-ORK tract.

ALTERNATE #	ALTERNATE DESCRIPTION	ADD/ DEDUCT	\$ AMOUNT
N/A	NONE		1

3. ALLOWANCES

The Allowances listed below reflect estimated dollar amounts for scopes of work that have yet to be fully defined. These amounts are included in Subcontract Price, and shall include all costs with markups as defined in the applicable terms of the Prime Contract. Charges against these allowances must be accompanied by estimate documentation pre-approved by DPR prior to the work being performed. Reconciliation of Allowance amounts to actual costs shall be accomplished by Change Order, and shall be in accordance to the applicable terms of the Prime Contract.

ALLOW # NONE ALLOWANCE DESCRIPTION

4. LABOR RATES:

Unless provisions of the Prime Contract provide for other methods of determining Subcontractor labor rates, the rates listed below will be used as the basis for determining reimbursable costs and for calculating the value of any labor changes to the Subcontract Price. These rates apply for the duration of the project and include all labor burdens, fringes, benefits, taxes, and insurance allowed by the Subcontract but shall not include markups for overhead and profit. If a labor classification has "OH" listed for its rate, that labor classification is included in Subcontractor's overhead and is not separately billable

	CREW MIX	STRAIGHT TIME	OVER TIME (TIME + %)	DOUBLE TIME
Foremas	5	5	\$	\$

ve of) COMPANY NAME CERTIFYING AGENCY NAME % of TOTAL SUB CLASSIFICATION

- End of Section A, Commercial Terms -

OPE REQUIREMENTS:

ctor's Work is to include, but not be limited to providing all labor, stallation, layout, engineering, hoisting, unloading, parking, shop nittals, mockups, benchmarks, fabrication, materials, equipment, ies, tools, facilities, transportation, storage, protection, handling, ctions, taxes (federal, state, county, local, etc.), overhead, profit, as required to timely complete the TERRACOTTA RAIN-L PANELS in accordance with the Agreement and as more spe-I in the Specification Sections listed below and as clarified theretion of the Specification Sections herein is for the convenience 3 Subcontractor and does not limit Subcontractor's responsibility

	to 2.8% of guantity installed for each type, composition, color, pattern, and size indicated for terracetta panels, along with the aturitour track support watern and related components.							
8	Store and handle terracetta panels in accordance with manufacturer's recommendations.							
_								

five (5) years, and installer's written warranty for a period of two (2) years from Substantial Completio

3. EXCLUSIONS:

	Cold Formed Metal Framing (CFMF)
10	Sheathing
3	Fluid Applied Air Barrier Membrane (except for patching/sealing at subgirt system anchers as required
1	Waterproofing
5	Joint Sealants
8	Trim and flashing around windows
· · ·	Counter fashing, regists and coping at root
3	Bonded corners
£	Interior terracotta panels at utility bridge corridors N3040 and N2300. (Refer to Section A1 on A-314)

NO OTHER EXCLUSIONS, CLARIFICATIONS, OR QUALIFICATIONS PROPOSED BY SUBCONTRACTOR ARE PART OF THIS AGREEMENT IF NOT EXPRESSLY ENUMERATED HEREIN.

- End of Section B, Specific Scope Requirements -

APPROVED AND ACCEPTED BY:

CONTRACT	OR:	SUBCONTRACTOR:					
	A GENERAL PARTNERSHIP		SUBCONTRACTOR NAME				
ly:		By					
ma:		Name:					
te:		Title:					



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Scope Delineation

- Trade Selection
- Installation sequence
- Warranty /maintenance
- Reduce the chance of voids in the scope or overlapping scopes



Scope Delineation



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Trade Partner Selection

Bid Tally

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Pricing

- Material Selection.
- Optimization Layout.
- Sub construction / Sub framing coordination
- Nomenclature definition of components and additional scope
- Inclusions and exclusions for installation sequencing.
- Crew size and schedule constrains
- Access and site logistics



Preconstruction -concurrent with overall construction

- Allow for review, revisions and approval
 - Shop dwgs Engineering and submittal process
 - Fabrication release
 - Samples and Mockup validate details

Logistics

- Site layout and site utilization
- Installation approach
- Access and deliveries
- Floating staging areas over time



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Installation



Sequencing & Coordination

- Construction flow
- Access / scaffolding
- Installation per "drop" vs " floor"

Logistics

- Deliveries
- Staging and laydown areas
- Cutting station
- Stocking
- Substrate preparation
- Field dimensions
- Minimize material handling

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Coordination



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Quality DPR CONSTRUCTION

Distinguishing Features of Work (DFOW) - Terracotta

ILH Patient Tower Quality Plan



Material Compliance Terracota – Dark Red, Ivory Sandblast Insulation Aluminum Trim Flashing/Coping Fasteners (Clip, M2): Self Tapping HH #10 min. x1": 300 Series SS HWH Self-Tapping #14 x 1" Wall Anchors: 300 Series SS HWH Self-Tapping w/Bonded Washer #14 x 2": Concrete Anchor (size TBD) Knight Wall support system Perforated Rails (provide splice joints) Shildan Components: Vertical Struc, System M2 (MP,EP,CP), Clips (2 ea. per panel: Top, Middle, Bottom), Gaskets



Pre-Start Check

Check for damage to the substrate Check joint alignment with other materials ie. punch windows, curtainwall, metal panels



Installation Details

Ensure miter corner is tight and aligns

Terracotta cuts – clean and controlled; less panel core exposure – bad ex. at Mock-Up punch window jamb detail Correct joint alignment during install

Aluminum Trim - ensure metal base trim is heavier gauge aluminum - avoid flimsy trim





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Quality



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Quality DPR CONSTRUCTION DE

Distinguishing Features of Work (DFOW) - Metal Panels

ILH Patient Tower Quality Plan



Material Compliance

Metal Wall Panel – Silver Metallic PVDF 3/SRI 58 – MPRS-1, MPRS-7 Vertical Sub-Girts – MPRS-1, MPRS-7 Insulation Thermal Isolated Support Clips Aluminum Trim Extrusion



Pre-Start Check

Check joint alignment with other materials le. punch windows, curtainwall, terracotta



Installation Details

Place sealant before placing riveted coping – avoid water penetration Pointed metal coping corners to be returned inside to avoid injuries Aluminum Trim – ensure metal base trim is heavier gauge – avoid waviness Louver trim extrusion – no waviness, maintain consistent 3/8" joint at jambs Seams in sill extrusion joint to be caulked and tightly fit trim pieces together





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Quality

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Maintenance & Operation



TOP PANEL INSTALLATION SEQUENCE WITH M2 SYSTEM

3 TOP PANEL INSTALLATION SEQUENCE FOR M2 3"=1'-0"

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Question & Answer



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