Dryvit Case Study Project

Lyman
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Dryvit Case Study Project - A Comparative Analysis

The following is a comparative analysis of the time and cost savings and benefits of using Dryvit EIFS with selected finish options as opposed to traditional clay brick masonry units and precast concrete panel exterior veneers. This study is based upon a theoretical three-story, steel frame medical office building, located in the south central part of the United States, and examines the structural steel framing (including footings) size and weight calculations, HVAC requirements, and project construction time and cost using both types of exterior claddings.

The Model Medical Office Building

The model building is a three-story building shell with bay sizes for use as a medical occupancy. The overall size of the building is 52,820 square feet. It has a typical floor plate of 17,630 square feet, with floor-to-floor heights of 13'-8", and "punched" window openings utilizing 1" thick insulated reflective glazing set in a thermal broken aluminum storefront window system. Attached are floor plans and exterior elevations as well as a 3D rendering of the building.

The study's exterior materials options are as follows:

Dryvit EIFS Option: Dryvit Outsulation® with a 2" thickness of rigid EPS insulation over 5/8" Densglas gypsum board sheathing on 6" metal studs at 16" O.C. with R19 fiberglass batt insulation. The Dryvit finishes used are Custom Brick™, Lymestone™ and TerraNeo®.

Clay Brick Veneer Option: Standard size Clay brick veneer with 2" air space on 5/8" thick Densglas sheathing on 6" metal studs at 16" O.C. with R19 fiberglass batt insulation. Other veneer materials include 4" thick limestone panels and 4" thick precast concrete panels with granite veneer.

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Structural Steel Framing System Analysis

The structural steel framing system required for each exterior cladding option was calculated to determine the weight and material differences. Any reduction in the weight and size of structural steel will result in a cost savings for the overall building. The results of the structural calculations indicate the following would be saved using Dryvit EIFS when compared to the clay brick veneer system:

1. 9,280 lbs. of steel if a perimeter moment frame lateral structure framing system is used.
2. 11,502 lbs. of steel if a braced frame lateral structural framing system is used.
3. 17,000 lbs. of steel for not using brick shelf angles.
4. 31.5 cubic yards of concrete for the reduced size in footings.
5. 12,000 pounds of 6" - 16 gauge exterior wall metal studs.

The full Structural Framing Systems Calculations Document can be reviewed in the appendix section of this report.

HVAC

A Heat Loss / Heat Gain Analysis was calculated for the building to determine if there were any HVAC unit size reductions and if any savings in energy usage could be predicted. By using Dryvit EIFS as compared to the clay brick veneer, the following savings were estimated to be achieved:

1. The total Mechanical peak load will be reduced by an estimated 62%.
2. The Total load will be reduced by an estimated 4.4%.
3. The Electrical peak load will be reduced by an estimated 22.6 kw/hr.
4. The Cooling tonnage can be reduced by 2.5 tons.
5. The average heating and cooling Mechanical load will be reduced by 62%.
6. The average heating Electrical load will be reduced by 13.5kw/hr.
7. The average cooling Electrical load will be reduced by 1.8 kw/hr.
8. The average Seasonal Energy Costs savings per season, assuming 0.07$kw-hr, will be $831.40 for the Heating season, and $155 for the Cooling season.

The full Heat Loss /Heat Gain Analysis can be reviewed in the appendix section of this report.

Construction Costs

A Construction Cost Analysis was done to compare the cost of the exterior wall components using the Dryvit Outsulation System versus traditional clay brick veneer. The results for the case study building were as follows:

1. Saved 112 cy of concrete by reducing footing sizes	($46,909)
2. Saved 14.25 tons of steel by changing the framing & misc. requirements.	($54,630)
3. Saved 12,000 lbs on exterior metal studs	($12,624)
4. Dryvit EIFS (Lymestone finish) in lieu of stone panels	($271,987)
5. Dryvit EIFS (TerraNeo finish) in lieu of precast concrete	($66,968)
6. Dryvit EIFS (Custom Brick finish) in lieu of clay brick veneer	($113,821)
7. Saved in a reduction of cooling tonnage of 2.5 tons	($3,262)
8. Total Savings	**($570,200)**

The full Construction Cost Analysis can be reviewed in the appendix section of this report.

Construction Schedule

A Construction Schedule Analysis was performed to determine if any time could be saved by using the Dryvit Outsulation System versus traditional clay brick veneer. Based on estimates submitted by subcontractors in the Nashville metropolitan area, the installation of Dryvit EIFS on the case study building would take approximately two (2) months to install versus approximately four (4) months to install a traditional clay brick veneer system. That results in an approximate two (2) month savings in exterior cladding system installation time by using Dryvit EIFS.

Conclusion

Based upon the Nashville Case Study project detailed herein, significant savings are likely if a Dryvit Outsulation EIF system is used in lieu of brick, precast concrete, and other stone veneers. These savings are manifested in foundation, structural steel, HVAC and cladding materials, as well as in construction time/labor costs.

Building Study Drawings

FIRST FLOOR PLAN

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REV. 2
REV. 3
REV. 4
REV. 5

Dryvit Case Study
Medical Office Bldg.
"Custom Brick" Comparison

dryvit

Dryvit
Case
Study

Medical Office Building
Dryvit Brick Option

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NO. 110
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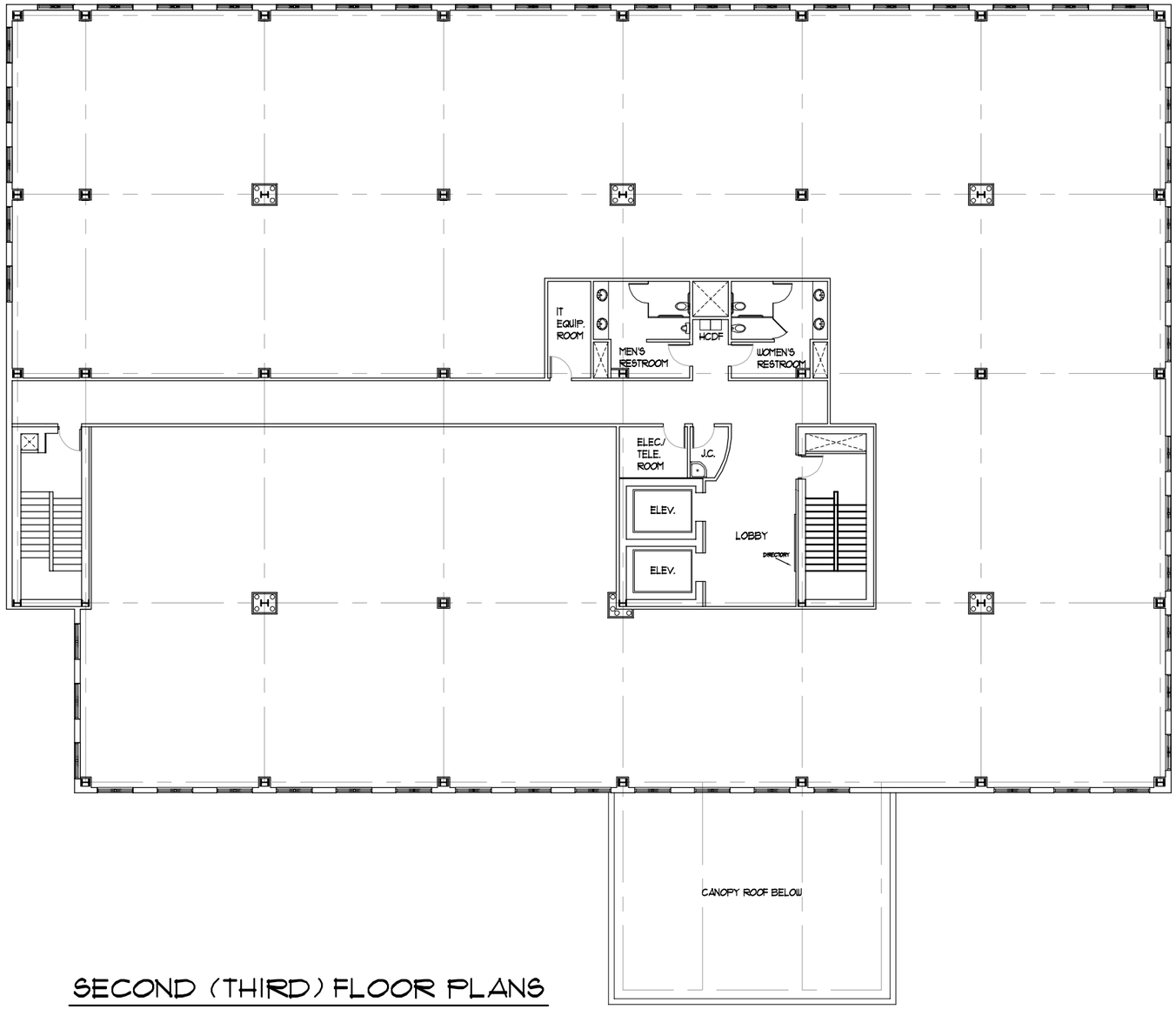

SECOND (THIRD) FLOOR PLANS

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Medical Office Building
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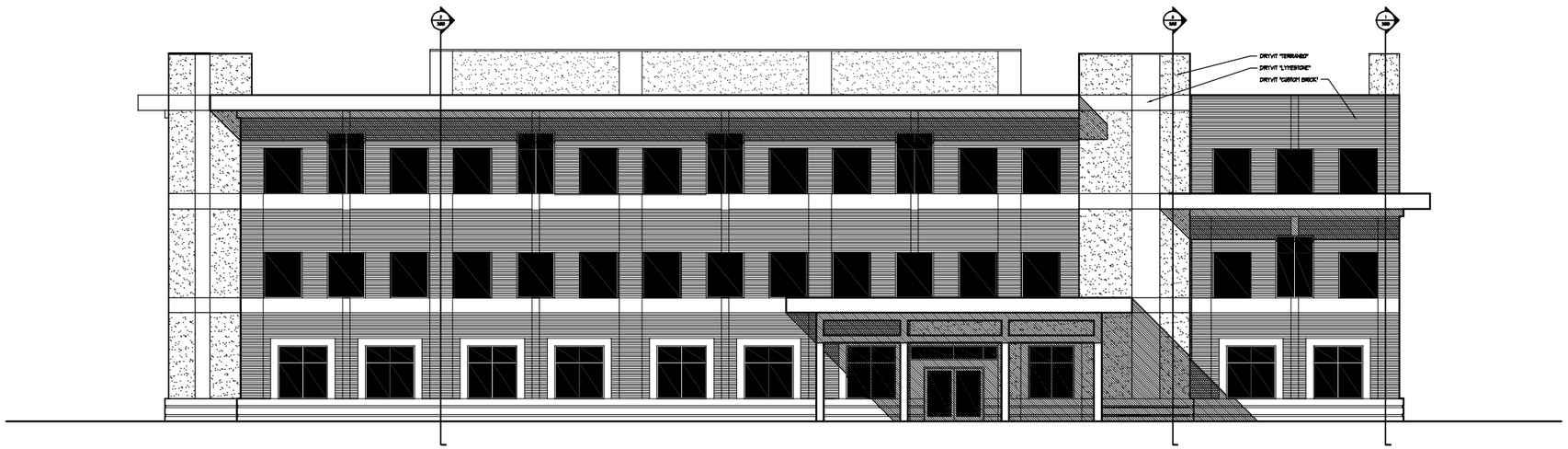
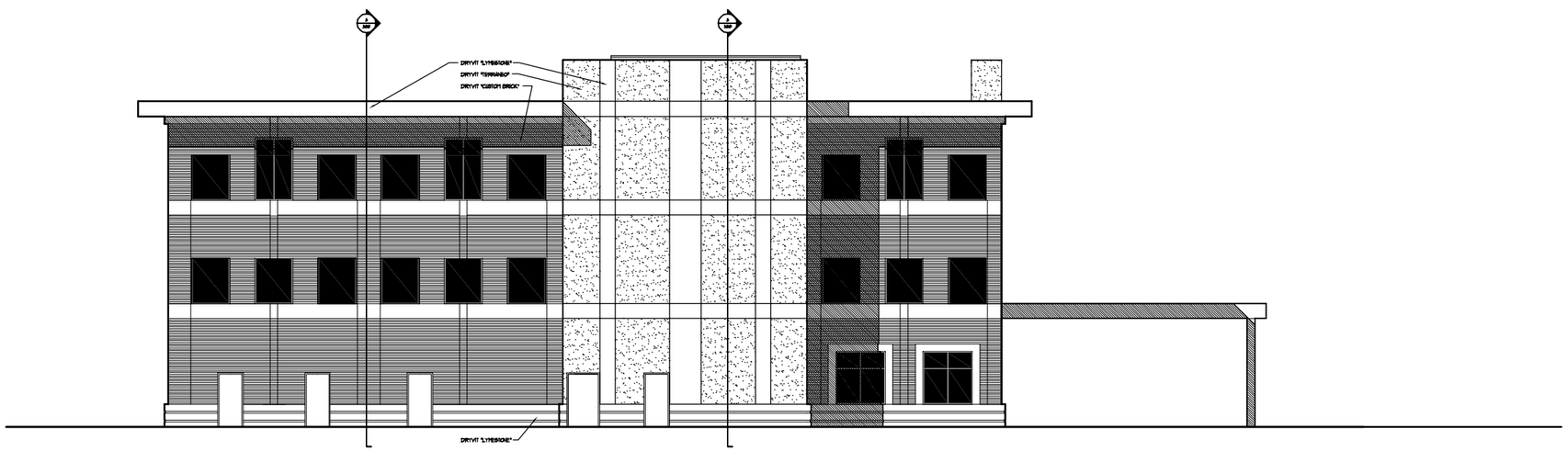


FRONT ELEVATION



LEFT SIDE ELEVATION

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Medical Office Building
Dryvit Brick Option

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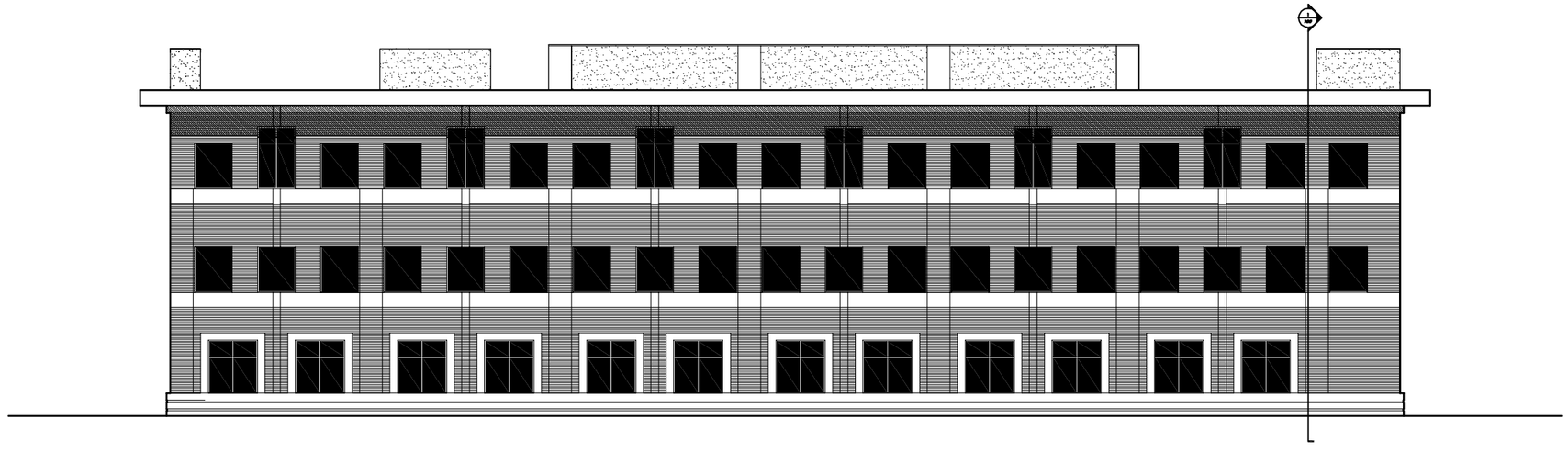

REAR ELEVATION

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JOB 205055.00

DESIGN TAD

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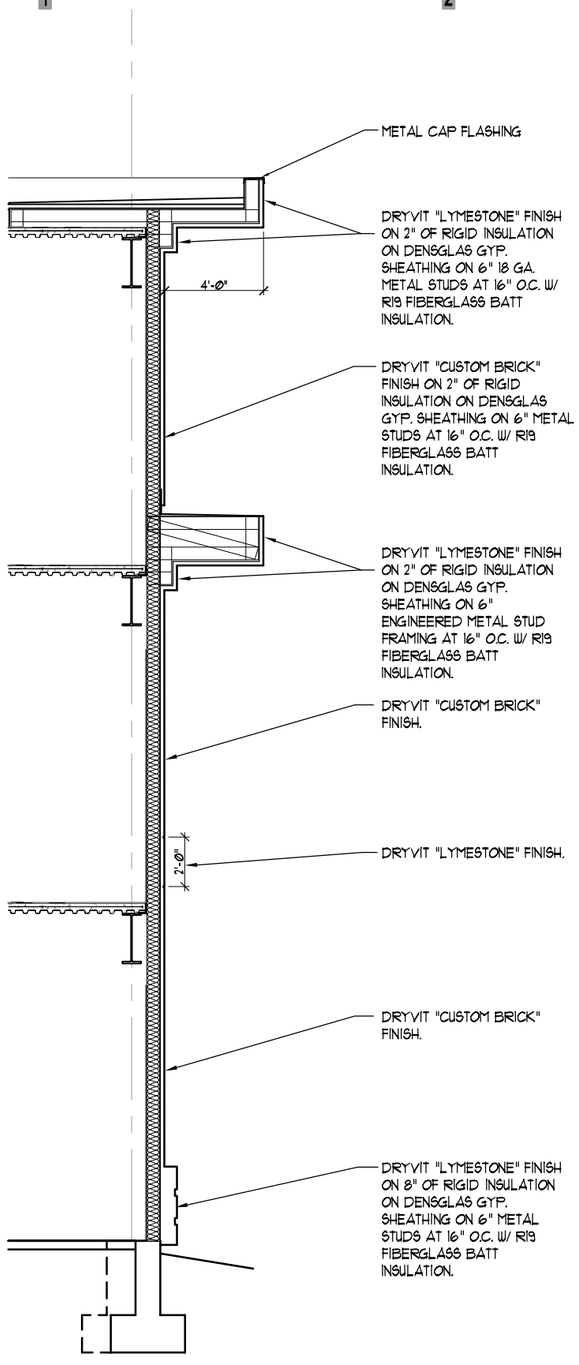
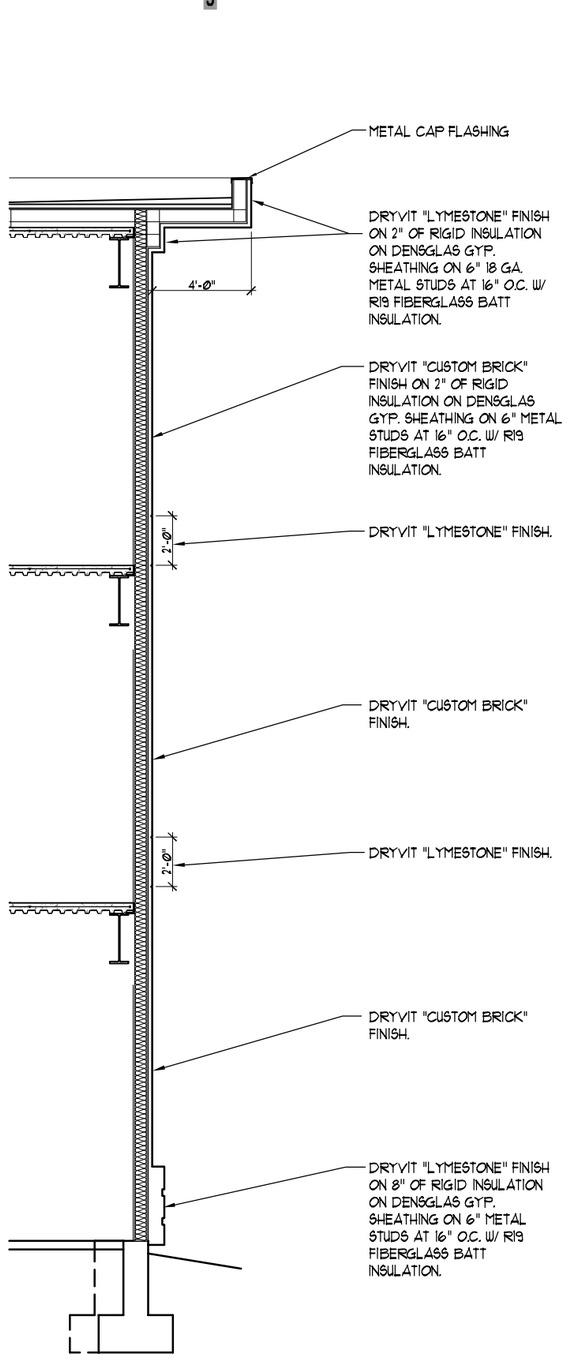
DATE 02/28/06



1 TYP. WALL SECTION



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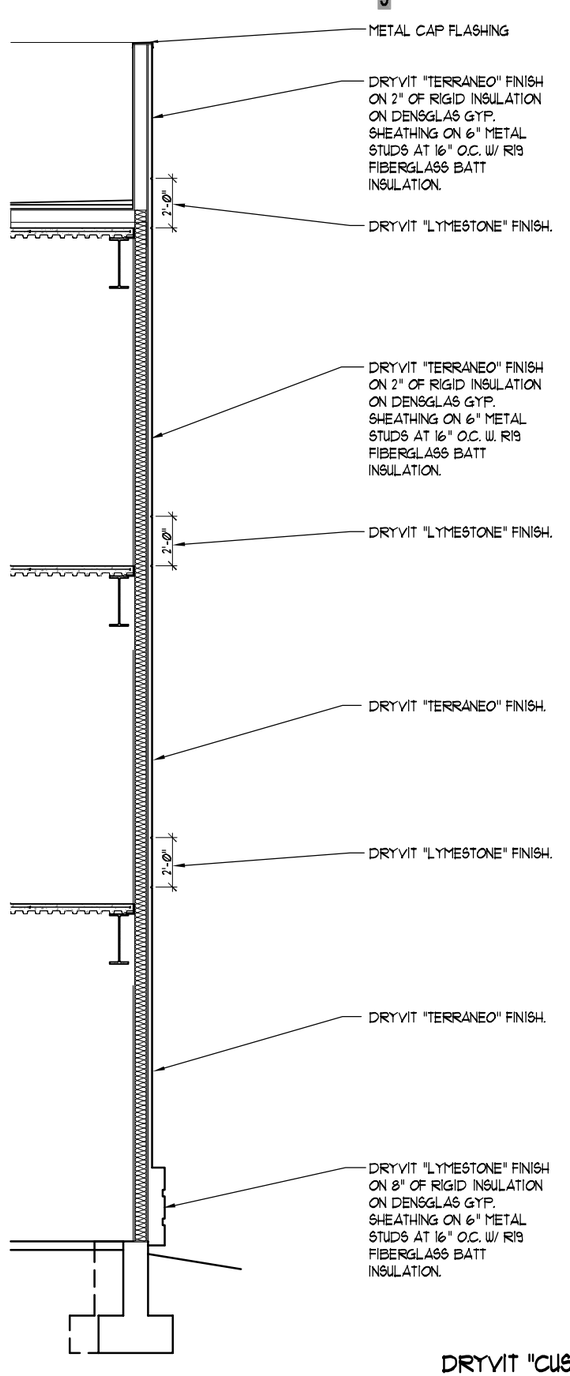

3 TYP. WALL SECTION

DRYVIT "CUSTOM BRICK" VENEER WALL SECTIONS

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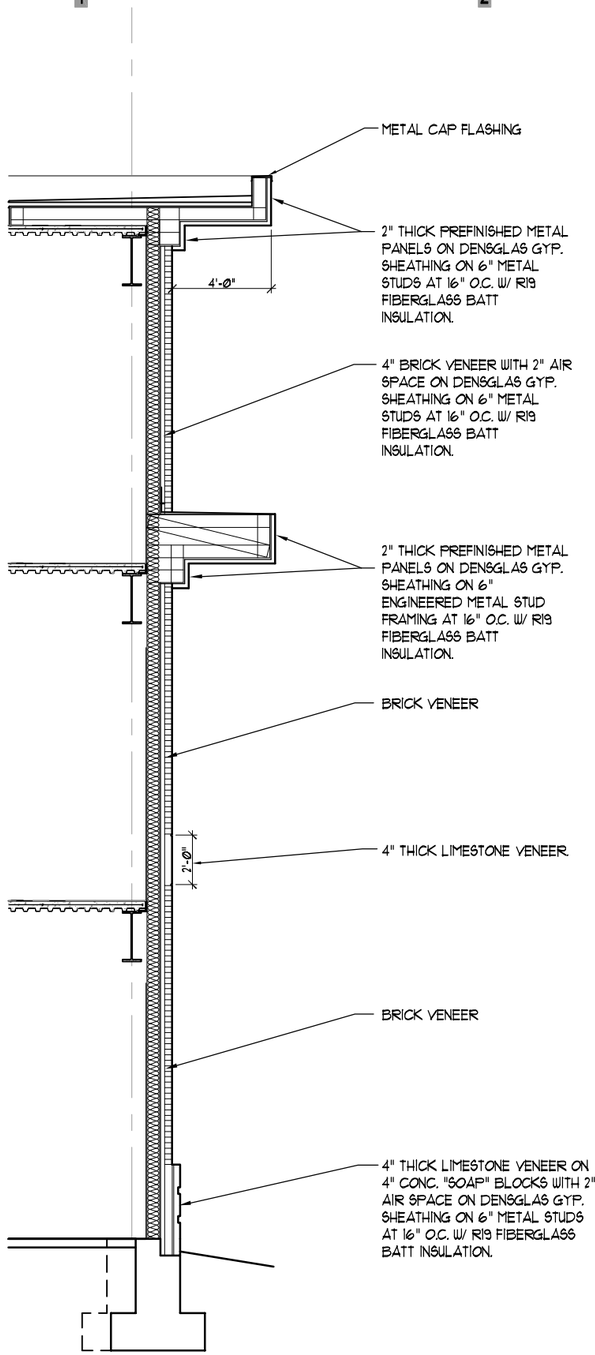

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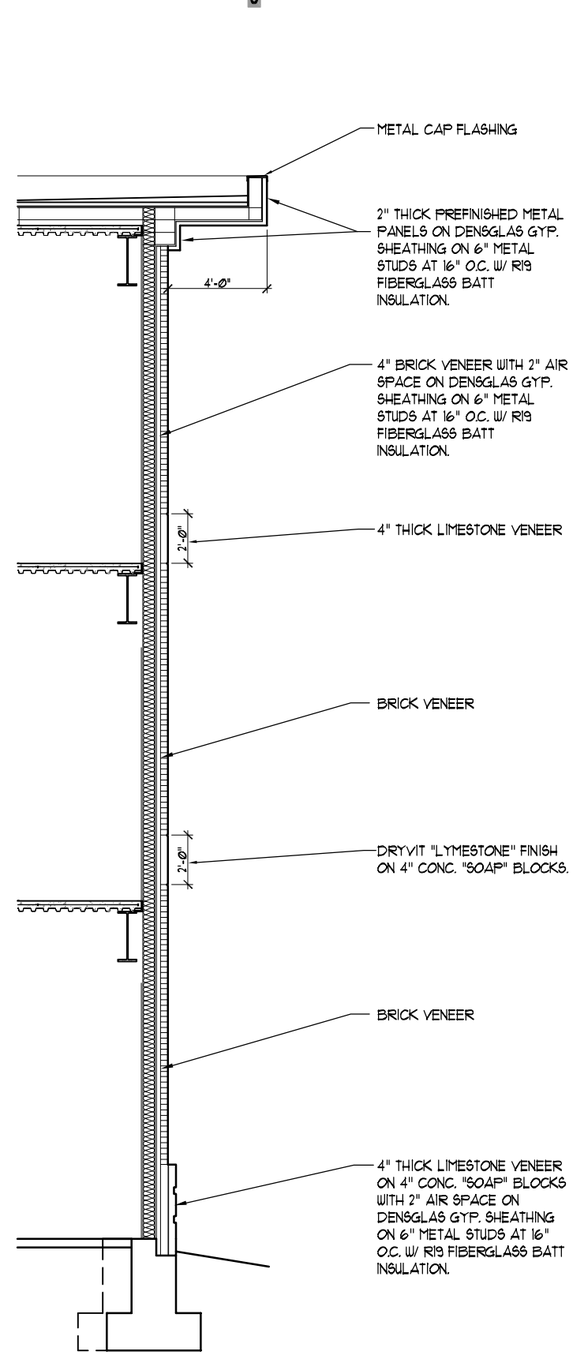

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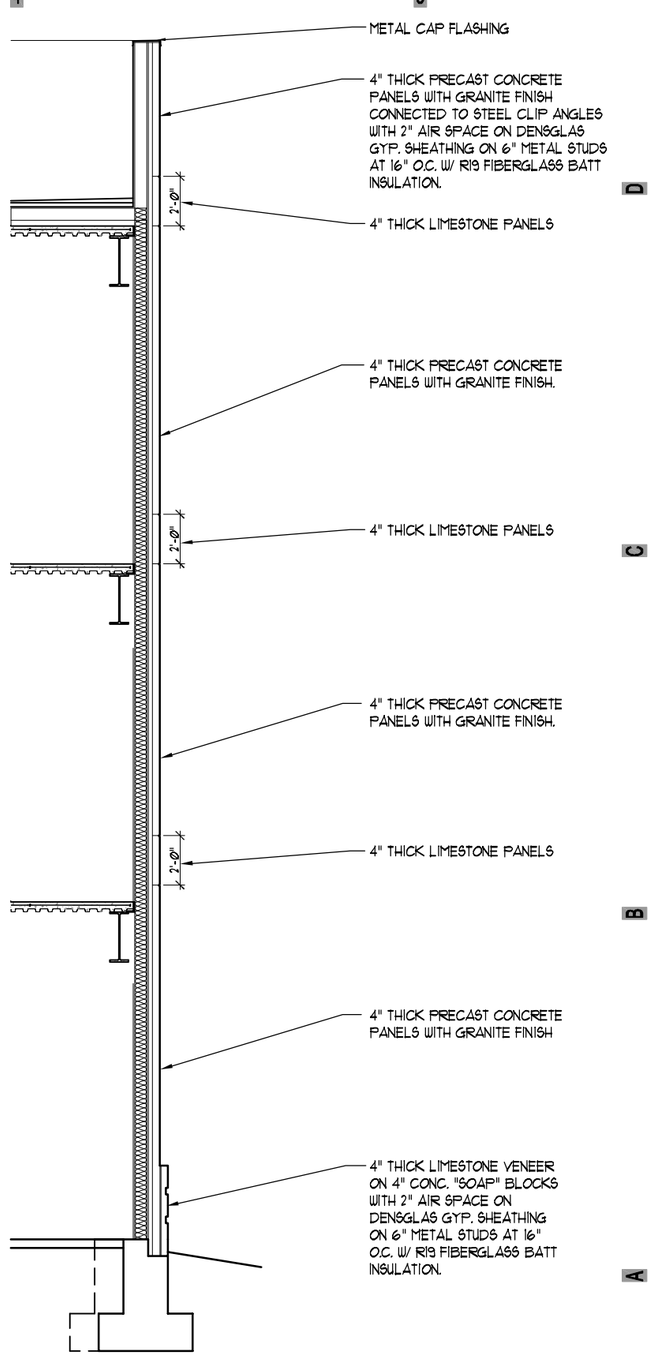

3 TYP. WALL SECTION

CLAY BRICK VENEER WALL SECTIONS

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DATE	02/28/06

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REV 2:
REV 3:
REV 4:

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Medical Office Building
Dryvit Brick Option

TITLE: Exterior Perspective

JOB: 205055.00
QC'ED: TAD
DRAWN: RMN

SHEET: 400

DATE: 02/28/06

Structural Framing Savings Comparisons

Structural Design Group

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February 15, 2006

Mr. Steve Juarez
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Exterior Insulation Finish System versus Brick Veneer Study

A study has been performed to evaluate the structural implications of an exterior insulation finish system (EIFS) versus a brick veneer system for a typical three-story, steel-framed medical office building. The study was performed to evaluate the impact on the structural frame, exterior wall studs, and foundations.

As a basis for the study, it was assumed that the project is located in the Central United States and the International Building Code is the prescribed building code. A 90 mph wind speed was selected. The seismic forces were based upon a 0.2-second spectral acceleration of 35 percent and a 1-second spectral acceleration of 15 percent. A Site Class D was chosen for determination of the seismic forces. A conventional shallow spread footing system with an allowable bearing capacity of 3,000 psf was assumed.

The typical medical office building is a steel-framed structure with compositely-designed beams and girders. Typically, welded moment frames are provided around the perimeter of the building to resist lateral loads due to wind and seismic forces. The study considered both a moment frame resisting system and a braced frame resisting system.

The evaluation of a brick veneer system on metal stud back-up as compared to an exterior insulation finish system is directly related to the weight of the two systems. The brick veneer system weighs approximately 675,000 pounds more than an EIFS system. Obviously this additional weight impacts the perimeter spandrel beams, columns, footings, exterior wall studs, etc.

Although the seismicity of the Central United States can vary widely, the spectral accelerations chosen are rather typical for the Middle Tennessee area. The design seismic forces for a particular structure are directly related to the weight/mass of the structure. While the additional weight of the brick veneer did impact the design of the lateral load resisting system, the impact was not great. The seismic forces increased by approximately 15 percent due to the additional weight associated with the brick veneer system. In areas of higher seismicity, the impact on the lateral load resisting system can be much larger.

The spandrel beams and girders did increase due to the additional weight of the brick. It should also be noted that a brick shelf angle is required at each floor level with the brick

veneer system. In addition, loose lintels are required above windows up to eight feet wide, and suspended brick lintels are required at windows over 8 feet wide.

Although the impact on the perimeter footings is not dramatic for a three-story building, it did impact the footing sizes. In addition to the increase in the footing sizes, it should be noted that the perimeter slab edge condition requires a ledge for support of the brick veneer as compared to an EIFS system, which requires no ledge.

The exterior metal studs are also impacted by the deflection requirements of brick versus EIFS. Both the Brick Institute of America and the model building codes require a wind load deflection limitation of L/600 as compared to a deflection limitation of L/240 for an EIFS system. A typical brick exterior system required 6-inch, 16-gage studs at 16 inches on-center for full height walls, whereas the EIFS system required 6-inch, 20-gage studs at 16 inches on-center.

The following table depicts the structural increases resulting from a brick veneer system as compared to an EIFS System.

Structural Premium for Brick Veneer System

Perimeter Moment Frame Lateral System						
Structural Member	**EIFS**	**Brick plf premium**	**# of elements**	**Length**	**Wt**	
East - West Columns	-	15	10	34	5,100	lbs
North - South Lat. Columns	-	7	10	34	2,380	lbs
Moment Frame Beams/Girders	-	-	-	-	-	lbs
Composite Spandrel Beams	-	9	8	25	1,800	lbs
				Total Wt. =	**9,280**	**lbs**

Braced Frame Lateral System						
Structural Member	**EIFS**	**Brick plf premium**	**# of elements**	**Length**	**Wt**	
Columns	-	3	21	34	2,142	lbs
Spandrel Beams	-	9	16	27.5	3,960	lbs
Girders	-	9	24	25	5,400	lbs
				Total Wt. =	**11,502**	**lbs**

Brick Shelf Angles		
	EIFS	**Brick**
Approximate Tonnage	-	8.5

Foundation Comparison				
Foundation Elements	**EIFS**	**Brick Concrete Premium**	**# of elements**	**Qty**
Footings	-	1.5	21	31.5 C.Y.

Exterior Metal Stud Comparison		
	EIFS	**Brick**
Stud Size	6-inch	6-inch
Gage	20	16
Spacing	16 inches	16 inches
Wt/ft	1.132	1.821
Weight Premium plf	-	0.689
Approximate total weight increase for building envelope	-	12,000 pounds

Please feel free to contact us if you need any additional information.

STRUCTURAL DESIGN GROUP

James M. Stephenson

James M. Stephenson P.E., S.E.

snh

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Energy and Mechanical Savings Comparisons

February 23, 2006

NASH LIPSEY BURCH, LLC.
Engineered Systems Consultants

Steven R. Juarez, AIA, NCARB
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Re: Dryvit Case Study

Objective:

To conduct a heat loss/heat gain analysis on a three-story Medical Office Building in order to compare and document the energy and mechanical systems savings of insulative value of the Dryvit "Custom Brick" exterior finish materials versus clay brick and precast concrete panel veneers.

Assumptions:

- All calculations were made assuming the pdf drawings sent on January 24, 2006 are currently accurate and unchanged.
- Only the impact of heat loss and heat gain was analyzed; the flow of water vapor through the different wall assemblies was not considered.
- The heating load was calculated with an outside design temperature of 10°F.
- The Cooling load was calculated with an outside design temperature of 95°F.
- Assume a DX rooftop air-handling unit with terminal electric reheat boxes.
- The hypothetical Medical Office Building load was calculated according to Nashville, TN weather conditions.

Procedure:

- All R-values were taken from the ASHRAE fundamentals 2005 edition.
- The calculations were made according to the parallel heat flow paths method from ASHRAE fundamentals 2005 edition.
- Brute version 6 software was used to calculate the load through the wall assemblies.

Table 1: Dryvit External Insulation

`	Heating	Cooling
Mech. Peak load (Btu/hr.)	-48,134	17,104
% Of load	2.9	0.8
Elec. Peak load (kw/hr.)	14.1	2.0
Tonnage	--	1.5
Avg. Mech. Load	28,880	10,262
Avg. Elec. Load	8.5	1.1
Seasonal Energy costs (.07/kw-hr.)	$523.6	$95

Note: These loads refer to heating and cooling associated with heat loss or heat gain through the wall assemblies, not total load of the building.

Table 2: Brick veneer & concrete panel exteriors

	Heating	Cooling
Mech. Peak load (Btu/hr.)	-125445	44573
% Of Total load	7.3	1.9
Elec. Peak Load (kw/hr.)	36.7	5.2
Tonnage	--	4
Avg. Mech. Load	75,267	26743
Avg. Elec. Load	22	2.9
Seasonal Energy costs (.07$/kw-hr.)	$1355	$250

Note: These loads refer to heating and cooling associated with heat loss or heat gain through the wall assemblies, not total load of the building.

Table 3: Savings through utilizing the Dryvit system

	Heating	Cooling
Mech. Peak load (Btu/hr.)	62% less	62% less
% of Total load	4.4 less	1.9 less
Elec. Peak Load (kw/hr.)	22.6 kw/hr. less	3.2 kw/hr. less
Tonnage	--	2.5
Avg. Mech. Load	62% less	62% less
Avg. Elec. Load	13.5 kw/hr. less	1.8 kw/hr.less
Seasonal Energy Costs (.07$/kw-hr.)	$831.40	$155

Note: These loads refer to heating and cooling associated with heat loss or heat gain through the wall assemblies, not total load of the building.

Conclusions:

The front- end costs of a cooling unit in this case would be very similar since coils are sized to peak load conditions and the two tonnages were only 2.5 tons difference. There would be a greater savings on the heating side. In the Dryvit case, the terminal reheat boxes would become smaller and thus less expensive. All else being the same, the cost of a unit which is 2.5 tons difference with another is very low. The yearly energy savings however, would be a bit more significant if the Dryvit external insulation were used. One thing to consider is the heat gain and heat loss through the wall assemblies make up a small percentage of the total heating and cooling load.

If you have any questions or comments, please feel free to call me.

Thanks,

Casey R. Hester, E.I.T
Mechanical Engineer

NASH LIPSEY BURCH, LLC
Engineered Systems Consultants
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Nashville, TN 37203

Construction Cost Savings Comparisons

Dryvit Case Study
Medical Office Building

Date: 24-May-06

Cost Summary	**Dryvit Scheme**	**Masonry/Precast Scheme**
Site Development - *Not Included*	$0	$0
Shell Office Building:		
General Requirements	$446,080	$446,080
Excavation & Foundations	$146,773	$191,878
Structure	$1,552,034	$1,604,562
Roofing & Waterproofing	$165,835	$165,835
Exterior Wall	$769,969	$1,217,469
Exterior Wall Components:		
Exterior Metal Studs and Sheathing	*$202,309*	*$214,448*
EIFS- Lymestone	*$65,382*	----
EIFS- Terraneo	*$39,132*	----
EIFS- Custom Brick	*$183,708*	----
Brick Veneer	----	*$293,151*
Precast	----	*$103,524*
Limestone	----	*$326,908*
Entrances & Storefronts / Misc.	*$279,438*	*$279,438*
Interior Partitions & Finishes	$352,428	$352,428
Specialties	$41,228	$41,228
Equipment & Furnishings	$15,201	$15,201
Vertical Transportation	$103,760	$103,760
Mechanical	$875,160	$878,296
Electrical	$501,884	$501,884
Contractor Fee	$198,814	$220,745
TOTAL	**$5,169,165**	**$5,739,365**

Savings:

Saved 112 cy of concrete by reducing footing sizes *	($46,909)
Saved 14.25 tons of steel by changing the framing & misc. requirements	($54,630)
Saved 12,000 lbs on exterior metal studs	($12,624)
Dryvit (Lymestone) in lieu of stone panels	($271,987)
Dryvit (Terraneo) in lieu of precast concrete	($66,968)
Dryvit (Custom Brick) in lieu of brick veneer	($113,821)
Saved in a reduction of cooling tonnage of 2.5 tons	($3,262)
Total Savings	($570,200)

See attached clarification

Batten & Shaw, Inc.
107 Music City Circle
Suite 300
Nashville, Tennessee 37214

Qualifications & Assumptions:

1. The conceptual pricing was based on Nashville, Tennessee unit prices, as well as, subcontractor budgets. Nashville area pricing, according to R.S. Means is 86.95% of the national average. Our numbers were therefore adjusted up to the national average.
2. Site Development was not included in this exercise. The site cost would have no direct impact on the cost of the exterior wall, which was the purpose of this study. Any allowance that we establish would be totally arbitrary and would not contribute to the results of this study.
3. The screen wall on the roof was included per the elevations and was assumed to be structural steel tube frames with louvers.
4. Based on a 52,896 sf building with a 1,520 sf drive thru canopy.
5. Based on an 8 month construction schedule
6. Please refer to the attached Estimate Detail for further assumptions and quantities.

Batten & Shaw, Inc.
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Dryvit Case Study

Medical Office Building - *Dryvit Scheme*

First Floor	17,632	sf
Second & Third Floors	35,264	sf
Canopy	1,520	sf
	54,416	**sf Total w/ Canopy**

	Description	Quantity	Unit	Labor Unit	Labor	Mat'l Unit	Material	Sub Unit	Sub Cost	Total	Remarks
$146,773	**Excavation & Foundations**	**$8.32**	**/sf of Foot Print**								
	Foundations	261	cy	0.00	0	0.00	0	350.00	91,382	91,382	with EIFS veneer
	Foundations	373	cy	0.00	0	0.00	0	350.00		0	with Masonry veneer
	Concrete slab on grade - shell	6,304	sf	0.00	0	0.00	0	5.00	31,520	31,520	
	Concrete slab on grade - tenant	0	sf	0.00	0	0.00	0	6.25		0	Included w/ TI
	Termite protection - all	17,632	sf	0.00	0	0.00	0	0.25	4,408	4,408	
$1,552,034	**Structure**	**$28.52**	**/sf of Structure**								
	Masonry shear walls	5,849	sf	0.00	0	0.00	0	8.50	49,720	49,720	
	Structural steel	323	tns	0.00	0	0.00	0	2750.00	888,250	888,250	with EIFS veneer
	Structural steel	329	tns	0.00	0	0.00	0	2750.00		0	with Masonry veneer
	Misc. steel	27	tns	0.00	0	0.00	0	3500.00	95,228	95,228	with EIFS veneer
	Misc. steel	36	tns	0.00	0	0.00	0	3500.00		0	with Masonry veneer
	Lightweight structural concrete	52,896	sf	0.00	0	0.00	0	3.50	185,136	185,136	
	Spray fireproofing	54,416	sf	0.00	0	0.00	0	2.20	119,715	119,715	
1632	Perimeter protection	1,632	lf	2.50	4,080	1.50	2,448	0.00	0	6,528	
$165,835	**Roofing & Waterproofing**	**$9.41**	**/sf of Roof Area**								
	Fully adhered membrane	17,632	sf	0.00	0	0.00	0	6.50	114,608	114,608	
	Pre-finished roof edge	544	lf	0.00	0	0.00	0	15.00	8,160	8,160	
	Roof walkway pads	1	ls	0.00	0	0.00	0	2500.00	2,500	2,500	
	Roof hatch	1	ea	0.00	0	0.00	0	750.00	750	750	
	Roof blocking	1,088	lf	2.50	2,720	1.50	1,632	0.00	0	4,352	
	Fully adhered membrane	1,520	sf	0.00	0	0.00	0	6.50	9,880	9,880	Canopy
	Pre-finished roof edge	100	lf	0.00	0	0.00	0	15.00	1,500	1,500	Canopy
	Roof blocking	200	lf	2.50	500	1.50	300	0.00	0	800	Canopy
$769,969	**Exterior Wall**	**$32.91**	**/sf of Exterior Wall**								
	Exterior wall sheathing & studs	23,397	sf	0.00	0	0.00	0	7.50	175,481	175,481	with EIFS veneer
	Exterior wall sheathing & studs	23,397	sf	0.00	0	0.00	0	7.95		0	with Masonry veneer
	EIFS - Lymestone	7,089	sf	0.00	0	0.00	0	8.00	56,711	56,711	
	EIFS - Terraneo	3,592	sf	0.00	0	0.00	0	9.45	33,943	33,943	
	EIFS - Custom Brick	16,952	sf	0.00	0	0.00	0	9.40	159,346	159,346	
	Brick Veneer	16,952	sf	0.00	0	0.00	0	15.00		0	
	Precast	3,592	sf	0.00	0	0.00	0	50.00		0	
	Limestone	7,089	sf	0.00	0	0.00	0	40.00		0	

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	Screenwall louvers	1,792	sf	0.00	0	0.00	0	25.00	44,800	44,800	
	Exterior hollow metal doors	5	ea	125.00	625	575.00	2,875	0.00	0	3,500	
	Aluminum punch windows	5,274	sf	0.00	0	0.00	0	30.00	158,220	158,220	
	Storefront doors	1	ea	0.00	0	0.00	0	1000.00	1,000	1,000	
	Automatic doors	2	pr	0.00	0	0.00	0	7500.00	15,000	15,000	
	Temporary protection	5,274	sf	1.50	7,911	0.50	2,637	0.00	0	10,548	
	Exterior caulking	23,397	sf	0.00	0	0.00	0	0.25	5,849	5,849	
$352,428	**Interior Partitions & Finishes**	**$6.48**	**/sf of Building Area**								
	Drywall - interior	25,815	sf	0.00	0	0.00	0	7.08	182,770	182,770	
	In-wall blocking	672	lf	1.50	1,008	1.50	1,008	0.00	0	2,016	
	Misc. millwork	1,200	sf	0.00	0	0.00	0	2.50	3,000	3,000	
	Vanities	48	lf	0.00	0	0.00	0	250.00	12,000	12,000	
	Interior sealants & caulking	6,304	sf	0.00	0	0.00	0	0.25	1,576	1,576	
	Doors and windows	22	ea	125.00	2,750	675.00	14,850	0.00	0	17,600	
	Interior glass	1	ls	0.00	0	0.00	0	1200.00	1,200	1,200	
	Flooring	6,304	sf	0.00	0	0.00	0	5.50	34,672	34,672	
	Acoustical ceilings	6,304		0.00	0	0.00	0	2.00	12,608	12,608	
	Wall finishes	6,304	sf	0.00	0	0.00	0	5.00	31,520	31,520	
	Paint HM frames	22	ea	0.00	0	0.00	0	45.00	990	990	
	Paint stairs & rails	2	ea	0.00	0	0.00	0	1500.00	3,000	3,000	
$41,228	**Specialties**	**$0.76**	**/sf of Building Area**								
	Recessed entry mats	80	sf	2.00	160	10.00	800	0.00	0	960	
	Toilet accessories & partitions	1	allow	3500	3,500	15000	15,000	0.00	0	18,500	
	Interior signs	0	ea	0.00	0	0.00	0	0.00	0	0	By Tenants
	Wall mounted directory	3	ea	0.00	0	0.00	0	1200.00	3,600	3,600	
	Entry Canopy letters	10	ea	0.00	0	0.00	0	1000.00	10,000	10,000	allowed 10 letters
$15,201	**Equipment & Furnishings**	**$0.28**	**/sf of Building Area**								
	Horizontal mini-blinds	5,274	sf	0.00	0	0.00	0	2.50	13,185	13,185	
$103,760	**Vertical Transportation**	**$17,293**	**/Stop**								
	Elevator	6	stops	0.00	0	0.00	0	15000.00	90,000	90,000	
$875,160	**Mechanical**	**$16.08**	**/sf of Building Area**								
	Plumbing	54,416	sf	0.00	0	0.00	0	4.25	231,268	231,268	
	HVAC	54,416	sf	0.00	0	0.00	0	8.45	459,815	459,815	with EIFS veneer
	HVAC	54,416	sf	0.00	0	0.00	0	8.50		0	with Masonry veneer
	Fire Protection	54,416	sf	0.00	0	0.00	0	1.25	68,020	68,020	
$501,884	**Electrical**	**$9.22**	**/sf of Building Area**								
	Electrical	54,416	sf	0.00	0	0.00	0	8.00	435,328	435,328	

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SUB TOTAL	23,254	41,550	3,847,659	3,912,463	
Taxes & Insurance				19,293	
Location Factor		15.07%		592,516	
Total Direct Cost				**4,524,271**	**$83.14**
General Conditions		8 months		388,280	
Building Permit Allowance		Based on 15 cents per SF		7,800	
Field Conditions / Contingency				50,000	
Contractor Fee		4.00%		198,814	
TOTAL COST				**5,169,165**	**$94.99**

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Dryvit Case Study

Medical Office Building - *Masonry Scheme*

First Floor	17,632	sf
Second & Third Floors	35,264	sf
Canopy	1,520	sf
	54,416	**sf Total w/ Canopy**

	Description	Quantity	Unit	Labor Unit	Labor	Mat'l Unit	Material	Sub Unit	Sub Cost	Total	Remarks
$191,878	**Excavation & Foundations**	**$10.88**	**/sf of Foot Print**								
	Foundations	261	cy	0.00	0	0.00	0	350.00		0	with EIFS veneer
	Foundations	373	cy	0.00	0	0.00	0	350.00	130,505	130,505	with Masonry veneer
	Concrete slab on grade - shell	6,304	sf	0.00	0	0.00	0	5.00	31,520	31,520	
	Concrete slab on grade - tenant	0	sf	0.00	0	0.00	0	6.25		0	Included w/ TI
	Termite protection - all	17,632	sf	0.00	0	0.00	0	0.25	4,408	4,408	
$1,604,562	**Structure**	**$29.49**	**/sf of Structure**								
	Masonry shear walls	5,849	sf	0.00	0	0.00	0	8.50	49,720	49,720	
14.25	Structural steel	323	tns	0.00	0	0.00	0	2750.00		0	with EIFS veneer
	Structural steel	329	tns	0.00	0	0.00	0	2750.00	904,063	904,063	with Masonry veneer
	Misc. steel	27	tns	0.00	0	0.00	0	3500.00		0	with EIFS veneer
	Misc. steel	36	tns	0.00	0	0.00	0	3500.00	124,978	124,978	with Masonry veneer
	Lightweight structural concrete	52,896	sf	0.00	0	0.00	0	3.50	185,136	185,136	
	Spray fireproofing	54,416	sf	0.00	0	0.00	0	2.20	119,715	119,715	
1632	Perimeter protection	1,632	lf	2.50	4,080	1.50	2,448	0.00	0	6,528	
$165,835	**Roofing & Waterproofing**	**$3.05**	**/sf of Roof Area**								
	Fully adhered membrane	17,632	sf	0.00	0	0.00	0	6.50	114,608	114,608	
	Pre-finished roof edge	544	lf	0.00	0	0.00	0	15.00	8,160	8,160	
	Roof walkway pads	1	ls	0.00	0	0.00	0	2500.00	2,500	2,500	
	Roof hatch	1	ea	0.00	0	0.00	0	750.00	750	750	
	Roof blocking	1,088	lf	2.50	2,720	1.50	1,632	0.00	0	4,352	
	Fully adhered membrane	1,520	sf	0.00	0	0.00	0	6.50	9,880	9,880	Canopy
	Pre-finished roof edge	100	lf	0.00	0	0.00	0	15.00	1,500	1,500	Canopy
	Roof blocking	200	lf	2.50	500	1.50	300	0.00	0	800	Canopy
$1,217,469	**Exterior Wall**	**$52.03**	**/sf of Exterior Wall**								
	Exterior wall sheathing & studs	23,397	sf	0.00	0	0.00	0	7.50		0	with EIFS veneer
	Exterior wall sheathing & studs	23,397	sf	0.00	0	0.00	0	7.95	186,010	186,010	with Masonry veneer
	EIFS - Lymestone	7,089	sf	0.00	0	0.00	0	8.00		0	
	EIFS - Terraneo	3,592	sf	0.00	0	0.00	0	9.45		0	
	EIFS - Custom Brick	16,952	sf	0.00	0	0.00	0	9.40		0	
	Brick Veneer	16,952	sf	0.00	0	0.00	0	15.00	254,275	254,275	
	Precast	3,592	sf	0.00	0	0.00	0	25.00	89,796	89,796	
	Limestone	7,089	sf	0.00	0	0.00	0	40.00	283,556	283,556	
	Screenwall louvers	1,792	sf	0.00	0	0.00	0	25.00	44,800	44,800	
	Exterior hollow metal doors	5	ea	125.00	625	575.00	2,875	0.00	0	3,500	
	Aluminum punch windows	5,274	sf	0.00	0	0.00	0	30.00	158,220	158,220	

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	Storefront doors	1	ea	0.00	0	0.00	0	1000.00	1,000	1,000	
	Automatic doors	2	pr	0.00	0	0.00	0	7500.00	15,000	15,000	
	Temporary protection	5,274	sf	1.50	7,911	0.50	2,637	0.00	0	10,548	
	Exterior caulking	23,397	sf	0.00	0	0.00	0	0.25	5,849	5,849	
$352,428	**Interior Partitions & Finishes**	**$6.48**	**/sf of Building Area**								
	Drywall - interior	25,815	sf	0.00	0	0.00	0	7.08	182,770	182,770	
	In-wall blocking	672	lf	1.50	1,008	1.50	1,008	0.00	0	2,016	
	Misc. millwork	1,200	sf	0.00	0	0.00	0	2.50	3,000	3,000	
	Vanities	48	lf	0.00	0	0.00	0	250.00	12,000	12,000	
	Interior sealants & caulking	6,304	sf	0.00	0	0.00	0	0.25	1,576	1,576	
	Doors and windows	22	ea	125.00	2,750	675.00	14,850	0.00	0	17,600	
	Interior glass	1	ls	0.00	0	0.00	0	1200.00	1,200	1,200	
	Flooring	6,304	sf	0.00	0	0.00	0	5.50	34,672	34,672	
	Acoustical ceilings	6,304		0.00	0	0.00	0	2.00	12,608	12,608	
	Wall finishes	6,304	sf	0.00	0	0.00	0	5.00	31,520	31,520	
	Paint HM frames	22	ea	0.00	0	0.00	0	45.00	990	990	
	Paint stairs & rails	2	ea	0.00	0	0.00	0	1500.00	3,000	3,000	
$41,228	**Specialties**	**$0.76**	**/sf of Building Area**								
	Recessed entry mats	80	sf	2.00	160	10.00	800	0.00	0	960	
	Toilet accessories & partitions	1	allow	3500	3,500	15000	15,000	0.00	0	18,500	
	Interior signs	0	ea	0.00	0	0.00	0	0.00	0	0	By Tenants
	Wall mounted directory	3	ea	0.00	0	0.00	0	1200.00	3,600	3,600	
	Entry Canopy letters	10	ea	0.00	0	0.00	0	1000.00	10,000	10,000	allowed 10 letters
$15,201	**Equipment & Furnishings**	**$0.28**	**/sf of Building Area**								
	Horizontal mini-blinds	5,274	sf	0.00	0	0.00	0	2.50	13,185	13,185	
$103,760	**Vertical Transportation**	**$17,293**	**/Stop**								
	Elevator	6	stops	0.00	0	0.00	0	15000.00	90,000	90,000	
$878,296	**Mechanical**	**$16.14**	**/sf of Building Area**								
	Plumbing	54,416	sf	0.00	0	0.00	0	4.25	231,268	231,268	
	HVAC	54,416	sf	0.00	0	0.00	0	8.45		0	with EIFS veneer
	HVAC	54,416	sf	0.00	0	0.00	0	8.50	462,536	462,536	with Masonry veneer
	Fire Protection	54,416	sf	0.00	0	0.00	0	1.25	68,020	68,020	
$501,884	**Electrical**	**$9.22**	**/sf of Building Area**								
	Electrical	54,416	sf	0.00	0	0.00	0	8.00	435,328	435,328	
	SUB TOTAL				23,254		41,550		4,323,221	4,388,025	
	Taxes & Insurance									20,196	
	Location Factor						15.07%			664,319	
	Total Direct Cost									**5,072,541**	**$93.22**

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General Conditions	8 months	388,280	
Building Permit Allowance	Based on 15 cents per SF	7,800	
Field Conditions / Contingency		50,000	
Contractor Fee	4.00%	220,745	
TOTAL COST		**5,739,365**	**$105.47**

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Concrete Footing Savings Quantity Difference Clarification

The difference between the exterior spread footings was based on 20 columns. Our plan actually has 22 exterior columns, therefore, the adjusted numbers would be as follows:

Spread Footings	EIFS	Brick	Difference
20 columns	89.4	120.0	(30.6)
22 columns	98.3	132.0	(33.6)

We received two different Turned Down Slab edge details. The detail for EIFS works out to .062 cy per foot of exterior wall. The detail for brick works out to .15 cy per foot of exterior wall. Based on 565 lf of exterior wall the difference in concrete would be as follows:

	EIFS	Brick	Difference
Turndown Slab Edge	35.0	84.8	(49.7)

When we estimate concrete foundation work on a project, we typically put a waste factor on the concrete quantities of 35%. This will typically cover the additional concrete required if we "neat cut" the foundations and pour with out forms. If forming is required due to the soil conditions, the additional concrete will usually cover the expense of forms. The savings in concrete with waste would be as follows:

	EIFS	Brick	Difference
Spread Footings	98.3	132.0	(33.6)
Turndown Slab Edge	35.0	84.8	(49.7)
Waste @ 35%	46.7	75.9	(29.2)
	Total		**(112)**

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Structural Design Group

220 Great Circle Road
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Nashville, Tennessee 37228
p. 615.255.5537
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www.sdg-structure.com

Memorandum

To: Mr. Steve Juarez

c:

From: Jared Ganstine

Date: May 22, 2006

Re: Exterior Insulation Finish System versus Brick Veneer Study

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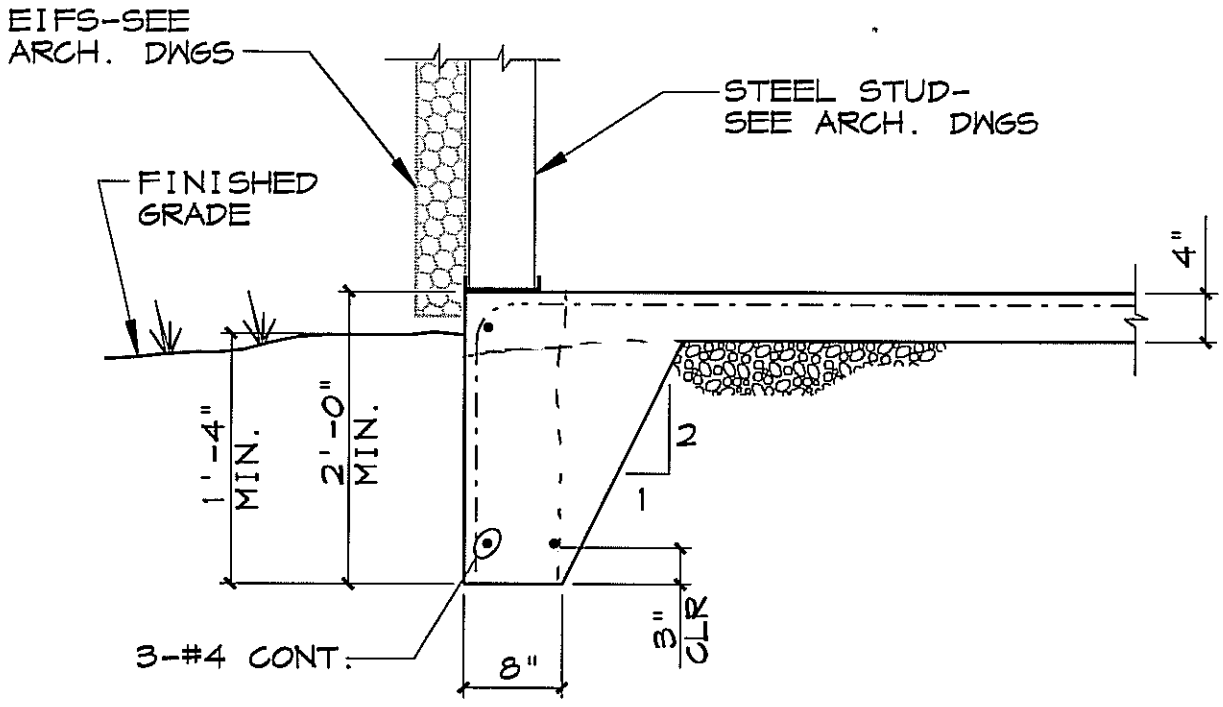
I'm responding to your request for additional quantities in regards with the foundation, and the possibility of using 3-5/8" metal studs in the exterior walls.

In comparison to the brick exterior column footings, the Dryvit system will require a footing approximately one size smaller than the brick exterior system. This would result in a total of 89.4 cubic yards of concrete, and 120 cubic yards of concrete for the Dryvit and brick exterior systems respectively (based on 20 exterior columns). The turned down slab conditions along the perimeter of the building will have some impact in the total amount of concrete required, as well as, an additional amount of forming. The total amount of savings will vary depending on the amount of linear feet along the exterior. The attached sketch of both turned down slab conditions can aid the contractor to calculate the total differences.

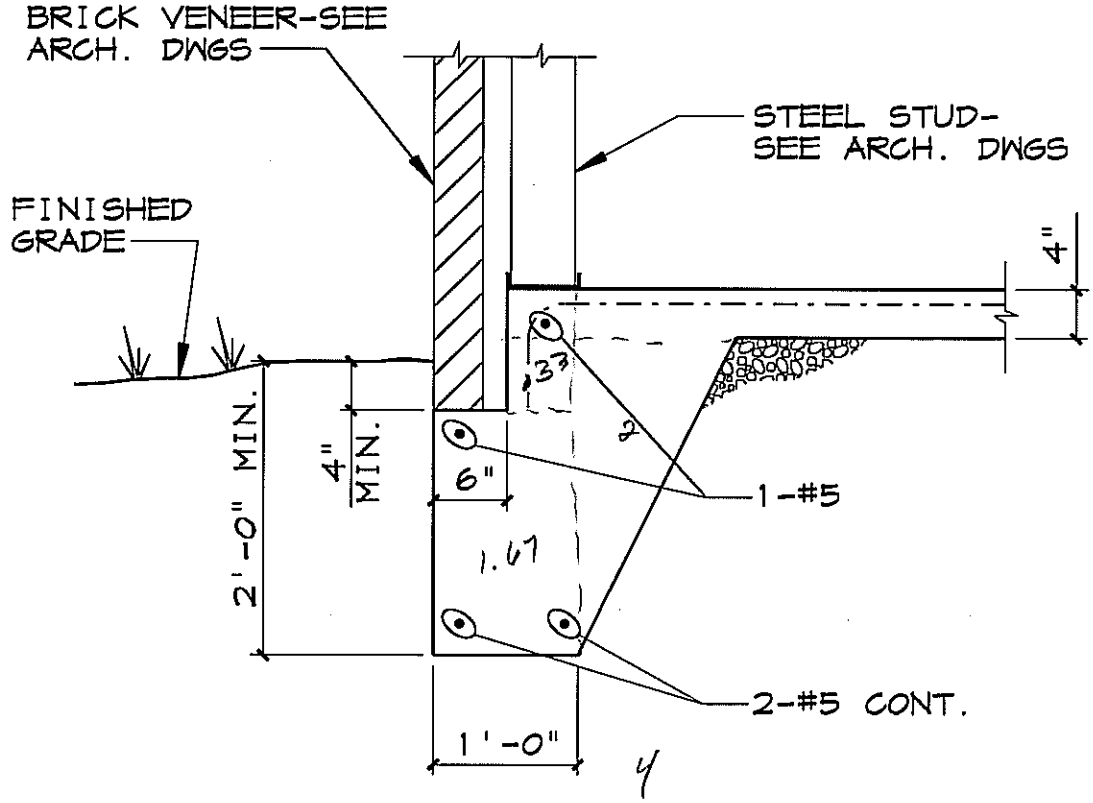
The possibility of using a 3-5/8" metal stud for the exterior walls instead of the typical 6" metal studs could be used, but it is impractical for the first floor exterior studs (based on the 16'-4" floor to floor height). To use a 3-5/8" metal stud on the first floor the studs could either be a CSW- 12 gage stud at 16 inches center on center, or a CSJ-12 gage stud at 12 inches center on center. The remaining upper two floors of the building could use a 3-5/8" CSJ-18 gage metal stud at 12 inches center on center (based on 14'-0" floor to floor height).

I hope this addresses all of your requested information, if you have any more questions please feel free to call or email me.

Thanks,
Jared Ganstine



2 SECTION AT TURNED DOWN SLAB WITH EIFS EXTERIOR



1 SECTION AT TURNED DOWN SLAB WITH BRICK EXTERIOR

Lyman Davidson Dooley, Inc.
209 10th Avenue South | Cummins Station Suite 327 | Nashville TN 37203 | ph. 615.244.7399 | fx. 615.244.6697