

| BUILDING INDUSTRY  | West Village Commons  |                         |
|--|---|-------------------------|
| PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY<br>• REASON FOR TWO SYSTEMS | <u>Project Team</u><br>Architect – GWWO, Inc<br>Constructor – Barton Malow Co.<br>MEP Engineer – James Posey, Ass.            |                         |
| • REDESIGN     • COST, DURATION ENERGY STRATEGY     • CENTRAL UTILITY PLANT FACADE STRATEGY  | MEP Engineer – James Posey, Ass.<br>Structural Engineer – ReSTL Engineers<br><u>Project Information</u><br>85,000 Square Feet |                         |
|  | July 2009 – May 2011<br>\$30.4 Million<br>CM At Risk with GMP   |                         |
| NICHOLAS UMOSELLA, LEED AP   | April 12 <sup>th</sup> , 2010   | CONSTRUCTION MANAGEMENT |

| BUILDING INDUSTRY   | BUILDING SYSTEMS   |   |  | Total Projec   | ct Cost   |  |
|---|--|---|--|--|---|--|
| PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY  | Architectural<br>• "Bridge" Over Emerson Dr.<br>• Large Multipurpose Rooms,  | <u>Structural</u><br>• RAM Aggregate Piers<br>• CIP Concrete North End  | Package<br>CM Preconstruction<br>Bid Package A<br>Bid Package B<br>Total | Total Project Cost<br>(TC)           \$300,000.00           \$7,120,965.00           \$22,961,029.00           \$30,381,994.00 | TC/SF<br>\$3.53<br>\$83.78<br>\$270.13<br>\$357.44† | MBE<br>Participation**<br>\$0.00<br>\$1,432,510.00<br>\$5,885,843.00<br>\$7,318,353.00 |
| • REASON FOR TWO SYSTEMS     • REDESIGN     • COST, DURATION ENERGY STRATEGY     • CENTRAL UTILITY PLANT FACADE STRATEGY     • RARLY INVOLVEMENT     • LAYOUT, DURATION, PHASING, COST, CONCLUSION ACKNOWLEDGEMENTS | Folding Partitions<br>• Extensive Kitchen/Dining<br>Space<br><u>Mechanical</u><br>• Seven Air Handling Units<br>• Two 3000 MBH Boilers<br>• 3535 MBH Chiller | <ul> <li>Structural Steel South End</li> <li><u>Facade</u></li> <li>Glazed Curtain Wall</li> <li>Brick Masonry</li> <li>Aluminum Metal Panel</li> </ul> |  | oncrete  | Steel   |  |
| NICHOLAS UMOSELLA, LEED AP  | April 12 <sup>th</sup> , 2010  |   |  | C  | ONSTRUCT  | ION MANAGEMEN  |

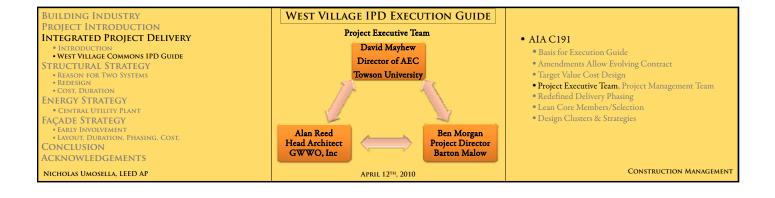
| Building Industry<br>Project Introduction  | INTEGRATED PROJECT DELIVERY  |  |
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| INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY<br>• REASON FOR TWO SYSTEMS<br>• ROBESIGN<br>• COST. DURATION<br>ENERGY STRATEGY<br>• CENTRAL UTILITY PLANT<br>FAÇADE STRATEGY<br>• EARLY INVOLVEMENT<br>• LAYOUT, DURATION, PHASING, COST,<br>CONCLUSION<br>ACKNOWLEDGEMENTS | "A project approach that integrates people, systems,<br>business structures and practices into a process that<br>collaboratively harnesses the talents and insights of all<br>participants to optimize project results, increase value<br>to the owner, reduce waste, and maximize efficiency<br>through all phases of design, fabrication, and<br>construction."(AIA) | <u>Goals</u><br>• Cleary Define What IPD Is<br>• Create a WVC IPD Execution Guide<br>• Develop Cost Saving Strategies that IPD Enables |
| Nicholas Umosella, LEED AP   | April 12™, 2010  | CONSTRUCTION MANAGEMENT  |

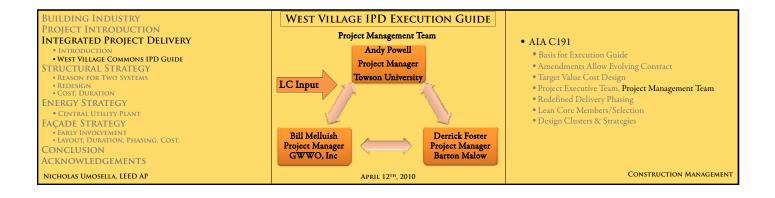
| BUILDING INDUSTRY<br>PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY<br>• REASON FOR TWO SYSTEMS<br>• REDESIGN<br>• COST, DURATION<br>ENERGY STRATEGY<br>• CENTRAL UTILITY PLANT<br>EACADE STRATEGY | THREE ELEMENTS OF IPD         I. Single Contractual Relation         •Shared Risk and Shared Reward         •Part of Profit Based on Project Goals         •Strong Reliance on each other "Trust is the Foundation of IPD"         II. Early Owner Selected Key Members         •Requires Sophisticated/Trusting Owner         •Selection at Project Inception |                         |
|--|--|-------------------------|
| FAÇADE STRATEGY<br>• EARLY INVOLVEMENT<br>• LAVOUT, DURATION, PHASING, COST,<br>CONCLUSION<br>ACKNOWLEDGEMENTS   |  |                         |
| NICHOLAS UMOSELLA, LEED AP   | April 12 <sup>th</sup> , 2010  | CONSTRUCTION MANAGEMENT |



| BUILDING INDUSTRY                                   | THREE ELEMENTS OF IPD                 |   |
|---|---------------------------------------|---|
| PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY | III. One Universal Model              | I. Single Contractual Relation<br>•Shared Risk and Shared Reward        |
| INTRODUCTION     WEST VILLAGE COMMONS IPD GUIDE     | •Integration of Design and            | Part of Profit Based on Project Goals                                   |
| STRUCTURAL STRATEGY                                 | Fabrication Drawings                  | •Strong Reliance on each other "Trust is the                            |
| Reason for Two Systems     Redesign                 | •3D Layout                            | Foundation of IPD"  |
| • COST, DURATION<br>ENERGY STRATEGY                 | •Material Tracking                    | II. Early Owner Selected Key Members                                    |
| • CENTRAL UTILITY PLANT<br>FACADE STRATEGY          | •Quality Control                      | •Requires Sophisticated/Trusting Owner                                  |
| • EARLY INVOLVEMENT                                 | •Accurate Take-offs and               | •Selection at Project Inception   |
| LAYOUT, DURATION, PHASING, COST,                    | Estimates                             | <ul> <li>Include Subs/Consults as Key Members or "Lean Core"</li> </ul> |
| CONCLUSION<br>ACKNOWLEDGEMENTS                      | •Target Value Design www.AtChyles.com |   |
|   | tinget time to opp                    |   |
| NICHOLAS UMOSELLA, LEED AP                          | April 12 <sup>th</sup> , 2010         | CONSTRUCTION MANAGEMENT   |

| BUILDING INDUSTRY  | WEST VILLAGE IPD EXECUTION GUIDE   |                         |
|--|--|-------------------------|
| PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>* INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY | Project Executive Team     AIA C191     Basis for Execution Guide     Amendments Allow Evolving Contract     True Vilo Contract  |                         |
| • REASON FOR TWO SYSTEMS     • REDESIGN     • COST, DURATION ENERGY STRATEGY     • CENTRAL UTILITY PLANT FACADE STRATEGY         | <ul> <li>Target Value Cost Design</li> <li>Project Executive Team, Project Management Team</li> <li>Redefined Delivery Phasing</li> <li>Lean Core Members/Selection</li> <li>Design Clusters &amp; Strategies</li> </ul> |                         |
| • EARLY INVOLVEMENT<br>• LAYOUT, DURATION, PHASING, COST,<br>CONCLUSION<br>ACKNOWLEDGEMENTS                                      |  |                         |
| NICHOLAS UMOSELLA, LEED AP   | April 12 <sup>th</sup> , 2010  | CONSTRUCTION MANAGEMENT |





| Concentral | Cribra Dagion | Detailed Design | Implementation | Acency | Construction | Closeout  |
|------------|---------------|-----------------|----------------|--------|--------------|-----------|
| ization    | March Meangin | Dennied Depign  | Documents      | Herel  |              | Gioboout. |
|            |               |                 |                | Buyout |              |           |
|            |               |                 |                |        |              |           |

| BUILDING INDUSTRY  | WEST VILLAGE IPD EXECUTION GUIDE  |   |
|--|---|---|
| VIEST VILLAGE COMMONS IPD GUIDE     STRUCTURAL STRATEGY     REASON FOR TWO SYSTEMS     REDESIGN     COST, DURATION | Redefined Delivery Phasing<br>• Conceptualization<br>• Contract Execution, PM Team Formation, Go/No-Go<br>• Criteria Design<br>• Project Specific Goals, LC Members Selected, Schematic<br>Designs, Broad Budget and Schedule<br>• Detailed Design<br>• Target Value Cost Set (beginning), Architecture Complete,<br>System Design through Design Clusters<br>• Implementation<br>• All engineering complete, Fabrication Begins,<br>Preconstruction, Bid process begins for Non - LC | <ul> <li>AIA C191</li> <li>Basis for Execution Guide</li> <li>Amendments Allow Evolving Contract</li> <li>Target Value Cost Design</li> <li>Project Executive Team, Project Management Team</li> <li>Redefined Delivery Phasing</li> <li>Lean Core Members/Selection</li> <li>Design Clusters &amp; Strategies</li> </ul> |
| NICHOLAS UMOSELLA, LEED AP   | Аркіі 12 <sup>тн</sup> , 2010   | Construction Management   |

| BUILDING INDUSTRY<br>PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLACE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY<br>• REASON FOR TWO SYSTEMS<br>• REDESIGN<br>• COST, DURATION<br>ENERGY STRATEGY<br>• CENTRAL UTILITY PLANT<br>FAÇADE STRATEGY<br>• ELARLY INVOLVEMENT<br>• LAYOUT, DURATION, PHASING, COST,<br>CONCLUSION<br>ACKNOWLEDGEMENTS | WEST VILLAGE IPD EXECUTION GUIDE         Redefined Delivery Phasing         • Agency Review       • Will be ongoing throughout Implementation and Detailed Design         • Will be ongoing throughout Implementation and Detailed Design       • Buyout         • Final Project Team Selected       • Construction         • Closeout       • Project Goals Evaluated, Compensation | <ul> <li>AIA C191</li> <li>Basis for Execution Guide</li> <li>Amendments Allow Evolving Contract</li> <li>Target Value Cost Design</li> <li>Project Executive Team, Project Management Team</li> <li>Redefined Delivery Phasing</li> <li>Lean Core Members/Selection</li> <li>Design Clusters &amp; Strategies</li> </ul> |
|--|--|---|
| NICHOLAS UMOSELLA, LEED AP   | April 12 <sup>th</sup> , 2010  | CONSTRUCTION MANAGEMENT   |

| BUILDING INDUSTRY<br>PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY<br>• REASON FOR TWO SYSTEMS<br>• REDESIGN<br>• COST, DURATION<br>ENERGY STRATEGY<br>• CENTRAL UTILITY PLANT<br>FAÇADE STRATEGY<br>• EARLY INVOLVEMENT<br>• LAYOUT, DURATION, PHASING, COST,<br>CONCLUSION | Lean Core Mer                 | EXECUTION GUIDE<br>mbers/Selection<br>econdary<br>• Fire Suppression Engineer*<br>• Fire Suppression Contractor*<br>• Drywall Contractor<br>• Lighting Consultant<br>• Sustainability Consultant<br>• Commissioning Agent | <ul> <li>AIA C191</li> <li>Basis for Execution Guide</li> <li>Amendments Allow Evolving Contract</li> <li>Target Value Cost Design</li> <li>Project Executive Team, Project Management Team</li> <li>Redefined Delivery Phasing</li> <li>Lean Core Members/Selection</li> <li>Design Clusters &amp; Strategies</li> </ul> |
|---|-------------------------------|---|---|
| ACKNOWLEDGEMENTS  | *Can Be Combined as a Design/ | Build Firm  | CONSTRUCTION MANAGEMENT   |
| Nicholas Umosella, LEED AP  | April 1                       | 2 <sup>TH</sup> , 2010  |   |

| BUILDING INDUSTRY<br>PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>* INTRODUCTION<br>* WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY<br>* REDESIGN<br>* COST, DURATION<br>ENERGY STRATEGY<br>* CENTRAL UTILITY PLANT<br>EACADE STRATEGY<br>* EARLY INVOLVEMENT<br>* LAYOUT, DURATION, PHASING, COST,<br>CONCLUSION<br>ACKNOWLEDGEMENTS | WEST VILLAGE IPD EXECUTION GUIDE         Design Clusters and Strategies         • Structural Design Cluster         • MEP Design Cluster         • Façade Design Cluster         • Kitchen/Food Service Design Cluster         • Utility Plant Design Cluster         • Site Plan and Safety Design Cluster | <ul> <li>AIA C191</li> <li>Basis for Execution Guide</li> <li>Amendments Allow Evolving Contract</li> <li>Target Value Cost Design</li> <li>Project Executive Team, Project Management Team</li> <li>Redefined Delivery Phasing</li> <li>Lean Core Members/Selection</li> <li>Design Clusters &amp; Strategies</li> </ul> |
|---|---|---|
| NICHOLAS UMOSELLA, LEED AP  | April 12 <sup>th</sup> , 2010   | CONSTRUCTION MANAGEMENT   |

| BUILDING INDUSTRY                                      | STRUCTURAL STRATEGY           |                            |
|--|-------------------------------|----------------------------|
| PROJECT INTRODUCTION                                   |                               | <b>G K</b>                 |
| INTEGRATED PROJECT DELIVERY                            |                               |                            |
| • INTRODUCTION   |                               |                            |
| WEST VILLAGE COMMONS IPD GUIDE                         |                               |                            |
| STRUCTURAL STRATEGY                                    |                               |                            |
| REASON FOR TWO SYSTEMS     REDESIGN                    |                               |                            |
| COST, DURATION   |                               |                            |
| ENERGY STRATEGY  |                               | +                          |
| • CENTRAL UTILITY PLANT                                |                               |                            |
| FAÇADE STRATEGY  |                               | 27' x 33' Bay Size         |
| EARLY INVOLVEMENT     LAYOUT, DURATION, PHASING, COST, |                               | (5) 4 Beams Spaced 6' - 6" |
| CONCLUSION   |                               | Columns Splice – 31'       |
| ACKNOWLEDGEMENTS                                       |                               | Columns spice – 51         |
| ACKINOW LEDGEMEIN 15                                   |                               |                            |
| NICHOLAS UMOSELLA, LEED AP                             | April 12 <sup>th</sup> , 2010 | CONSTRUCTION MANAGEMENT    |

| BUILDING INDUSTRY  | STRUCTURAL S  | TRATEGY           |  |  |  |  |
|--|---|-------------------|--|--|--|--|
| PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY        | Typical Bay: Roof and Flo   | or Below, Columns |  |  |  |  |
| INTRODUCTION     WEST VILLAGE COMMONS IPD GUIDE            | <u>Roof</u> <ul> <li>Live Load = 30 psf (includes snow)</li> </ul>                  |                   |  |  |  |  |
| STRUCTURAL STRATEGY  | • Dead Load = 85 psf (deck, LWC   |                   |  |  |  |  |
| REASON FOR TWO SYSTEMS     REDESIGN                        | • $w = 1.2(D_L * A_t) + 0.5(L_L * A_t)$<br>• Beams                                  |                   |  |  |  |  |
| Cost, Duration     ENERGY STRATEGY                         | • Beams<br>w = 760.5 lbs/ft   |                   |  |  |  |  |
| • Central Utility Plant<br>FACADE STRATEGY                 | $M_U = wl^2/8 = 69.3 \text{ Kips} - \text{ft}$<br>$V_U = wl/2 = 10.27 \text{ Kips}$ | Girders: W24 x 55 |  |  |  |  |
| • EARLY INVOLVEMENT     • LAYOUT, DURATION, PHASING, COST. | • Girders   | Beams: W 14 x 22  |  |  |  |  |
| CONCLUSION   | w = 2.49  kips/ft<br>$M_{11} = wl^2/8 = 340.3 \text{ Kips} - \text{ft}$             |                   |  |  |  |  |
| ACKNOWLEDGEMENTS   | $M_U = wl/8 = 540.5 \text{ Kips} - 10$<br>$V_U = wl/2 = 41.91 \text{ Kips}$         |                   |  |  |  |  |
| NICHOLAS UMOSELLA, LEED AP                                 | APRIL 12 <sup>TH</sup> , 2  | 010               |  |  |  |  |

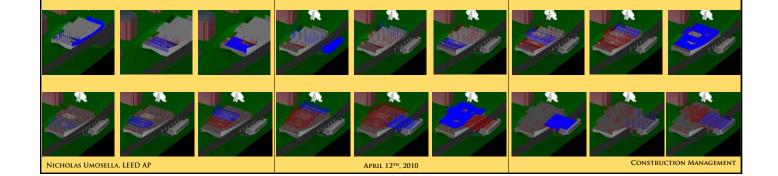
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|---|--|--|
|---|--|--|

| BUILDING INDUSTRY   | STRUCTURAL STRATEGY   |                   |
|---|---|-------------------|
| PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE   | Typical Bay: Roof and Floor Below, Columns<br><u>Columns</u><br>• Load from fourth floor bay  |                   |
| STRUCTURAL STRATEGY<br>• Reason for Two Systems<br>• Redegion<br>• Cost, Duration<br>ENERGY STRATEGY<br>• CENTRAL UTILITY PLANT<br>FAÇADE STRATEGY<br>• EARLY INVOLVEMENT<br>• LAYOUT, DURATION, PHASING, COST, | •214.5 Kips<br>• Load from roof bay<br>•104.36 Kips<br>• Total load on Column<br>• $P_U$ = 318.86 Kips<br>• Typical length is 31 feet<br>• $r_X/r_Y$ = 2.64<br><b>Columns: W12 x 40</b> |                   |
| CONCLUSION<br>ACKNOWLEDGEMENTS<br>NICHOLAS UMOSELLA, LEED AP  | • KL <sub>eff</sub> = 11.74<br>April 12 <sup>th</sup> , 2010  | Construction Man/ |



| BUILDING INDUSTRY<br>PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY<br>• REASON FOR TWO SYSTEMS<br>• REDESIGN<br>• COST, DURATION<br>ENERGY STRATEGY<br>• CENTRAL UTILITY PLANT<br>FAÇADE STRATEGY<br>• LAYOUT, DURATION, PHASING, COST,<br>CONCLUSION<br>ACKNOWLEDGEMENTS | STRUCTURAL STRATEGYCostCost of Steel = \$2,600 per tonLWC on Metal Deck = \$184/CYWelded Wire Mesh (6x6 W2.9 x W2.9) = \$57/CSFMetal Decking = \$3.15/SFRoof Decking = \$3.15/SFRoof Decking = \$3.280/SFOriginal Estimate of Structure = \$3,235,398New Estimate of Structure = \$3,001,419Savings = \$233,978.70 | Duration<br>•Original Duration on Critical Path<br>• 118 Days = 23.6 Weeks<br>• New Duration (Assuming entirely on Critical Path)<br>• 68 Days = 13.6 Weeks<br>• Savings<br>• 10 Weeks = \$271,061 in General Conditions & Fee<br>• Total Savings<br>• <b>\$505,040 and 2.5 Months</b> |
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| NICHOLAS UMOSELLA, LEED AP   | April 12 <sup>th</sup> , 2010  | CONSTRUCTION MANAGEMENT  |

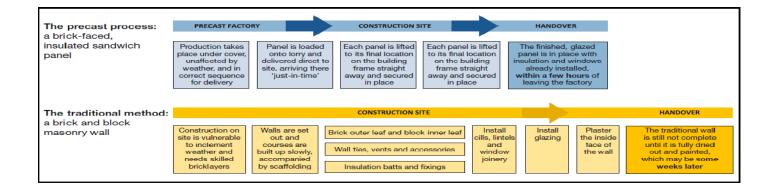
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|--|-------------------------------|-------------------------|
| EACADE STRATEGY<br>• EARLY INVOLVEMENT<br>• LAYOUT, DURATION, PHASING, COST,<br>CONCLUSION<br>ACKNOWLEDGEMENTS   |                               |                         |
| NICHOLAS UMOSELLA, LEED AP   | April 12 <sup>th</sup> , 2010 | CONSTRUCTION MANAGEMENT |



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|--|--|---|
| NICHOLAS UMOSELLA, LEED AP   | April 12 <sup>th</sup> , 2010  | CONSTRUCTION MANAGEMENT   |

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|--|--|-------------------------|
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|---|---|--|--|
| NICHOLAS UMOSELLA, LEED AP  | April 12 <sup>тн</sup> , 2010   |  | CONSTRUCTION MANAGEMENT  |



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|--|----------------------|
| • CENTRAL UTILITY PLANT FAÇADE STRATEGY • LARLY INVOLVEMENT • LAYOUT, DURATION, PHASING, COST, CONCLUSION ACKNOWLEDGEMENTS NICHOLAS UMOSELLA, LEED AP  | ABCCEFGHABCDEFGHUJKL |

| Building Industry<br>Project Introduction            |               | FAÇADE STRATEGY               |                  |      |        |               |         |      |                    |                              |               |           |                      |           |                       |            |
|--|---------------|-------------------------------|------------------|------|--------|---------------|---------|------|--------------------|------------------------------|---------------|-----------|----------------------|-----------|-----------------------|------------|
| INTEGRATED PROJECT DELIVERY                          |               | I                             | <sup>7</sup> aça | de ( | Const  | ructi         | on C    | osts |                    |                              |               |           | Durati               | on        |                       |            |
| INTRODUCTION     West Village Commons IPD Guide      |               | ELV                           | Unit             | QTY  |        | Cubic<br>Feet |         |      | Cost<br>\$/Unit    | Total Cost                   | System        | Elevation | Duration<br>Unit     | Qty       | Daily Output          | Duration   |
| STRUCTURAL STRATEGY                                  | Panels        |                               |                  |      |        |               |         |      |                    |                              | Panels        |           |                      |           |                       |            |
| REASON FOR TWO SYSTEMS                               |               | East                          | SF               |      |        |               | 155 pcf |      | \$55.00            | \$119,900.00                 |               | East      | # of Panels          | 17        | 8.00                  | 2.1        |
| REDESIGN   |               | West                          | SF               | 2,99 |        |               | 155 pcf |      | \$55.00<br>\$55.00 | \$164,615.00<br>\$190,960.00 |               | West      | # of Panels          | 20        | 8.00                  | 3.3        |
| COST. DURATION                                       |               | South                         |                  | 3,47 |        |               | 155 pcf |      | \$55.00<br>\$55.00 |                              |               | North     | # of Panels          | 30        | 8.00                  | 3.8        |
| ENERGY STRATEGY                                      |               |                               |                  |      | 4 Tota |               | Total   |      |                    |                              |               | South     | # of Panels<br>Total | 50<br>129 | 8.00<br>Total         | 7.0        |
| CENTRAL UTILITY PLANT                                | Brick Masonry |                               |                  |      |        |               |         |      |                    |                              | Brick Masonry |           | 10(2)                | 12,       | 1012                  | 10.1       |
|  |               | East                          |                  | 2,18 | iO -   |               | 42 psf  |      | \$24.00            | \$52,320.00                  |               | East      | SF                   | 2,180     | 215                   | 10.1       |
| FAÇADE STRATEGY                                      |               | West                          | SF               |      | 13 .   | 998<br>1,157  |         | 63   | \$24.00<br>\$24.00 | \$71,832.00<br>\$83,328.00   |               | West      | SF                   | 2,993     | 215                   |            |
| EARLY INVOLVEMENT                                    |               | South                         | SF               |      | 2      | 1,157         |         | 104  | \$24.00            |                              |               | North     | SF                   | 3,472     |                       |            |
| <ul> <li>LAYOUT, DURATION, PHASING, COST,</li> </ul> |               |                               |                  |      | 4 Tota |               |         |      |                    |                              |               | South     | SF                   | 4,969     | 215                   | 23.1       |
| CONCLUSION   |               |                               |                  |      |        |               |         |      |                    |                              |               | _         | Total                | 13,614    | Total<br>BMC Duration | 63.3<br>80 |
| ACKNOWLEDGEMENTS                                     |               |                               |                  |      |        |               |         |      |                    |                              |               |           |                      |           | BMC Duration          | 80         |
| NICHOLAS UMOSELLA, LEED AP                           |               | April 12 <sup>th</sup> , 2010 |                  |      |        |               |         |      |                    |                              |               |           | (                    | Constr    | RUCTION MAN           | IAGEMENT   |

| BUILDING INDUSTRY   | FAÇADE STRATEGY   |   |
|---|---|---|
| PROJECT INTRODUCTION  | Duration Analysis   | Cost Increase   |
| INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY  | <ul> <li>Masonry Original Duration on Critical Path</li> <li>17 days = 3.4 Weeks</li> <li>Framing and Sheathing on Critical Path</li> </ul> | <ul> <li>Added Material Price</li> <li>\$422,034</li> <li>General Conditions and Fee Savings</li> </ul> |
| REASON FOR TWO SYSTEMS     REDESIGN     COST. DURATION     ENERGY STRATEGY     CENTRAL UTILITY PLANT  | <ul> <li>70 Days = 14 Weeks but</li> <li>70% Pertains to Masonry = 47 Days, 9.4 Weeks</li> <li>Savings</li> </ul>                           | \$268,024     Added Cost for Prefabricated Panels     \$154,010   |
| CONTACT OF CONTROL OF CONTRO | • 48 Weeks, 2.4 = \$260,218 in General Conditions<br>= \$7,806 In CM Fee  |   |
| NICHOLAS UMOSELLA, LEED AP  | April 12 <sup>th</sup> , 2010   | CONSTRUCTION MANAGEMENT   |

| BUILDING INDUSTRY<br>PROJECT INTRODUCTION<br>INTEGRATED PROJECT DELIVERY<br>• INTRODUCTION<br>• WEST VILLAGE COMMONS IPD GUIDE<br>STRUCTURAL STRATEGY<br>• REASON FOR TWO SYSTEMS<br>• REDESIGN<br>• COST, DURATION<br>ENERGY STRATEGY<br>• CENTRAL UTILITY PLANT<br>FAÇADE STRATEGY<br>• CENTRAL UTILITY PLANT<br>FAÇADE STRATEGY<br>• LAVOUT, DURATION, PHASING, COST,<br>CONCLUSION<br>ACKNOWLEDGEMENTS | FAÇADE STRATEGY         Transportation         • Restrictions Before Permitting Requirement         • 8 Feet Wide         • 8 Feet Tall off Bed         • 42 Feet Long         • 8 Tons         • Average Size Panels Can Fit Three per Truck         • 129 Panels         • 45 – 50 Truck Loads | Panel to panel<br>is 40 feet<br>8' Wide max |
|--|--|---|
| NICHOLAS UMOSELLA, LEED AP   | April 12 <sup>th</sup> , 2010  | CONSTRUCTION MANAGEMENT                     |

| WEST VILLAGE COMMONS IPD GUIDE STRUCTURAL STRATEGY  REASON FOR TWO SYSTEMS  REDESIGN COST, DURATION ENERGY STRATEGY CENTRAL UTILITY PLANT FAÇADE STRATEGY ELARLY INVOLVEMENT LAVOLT DURATION, PHASING, COST. | CONCLUSION<br>Integrated Project Delivery Enables<br>• Structural Engineer and Steel Fabricator Design Together<br>• \$505,040 and 2.5 Months<br>• Precast Concrete Contractor Involved Early<br>• 2.6 Month Savings<br>• Increased cost, but Additional Savings can be Found if<br>Curtain Wall is Unitized, Interior Work Begins Earlier<br>• Part of Compensation Based on Project Goals<br>• Better Relationship, Clearer Vision of Project, More<br>Accurate Cost Information | Current<br>HERENTATIONS<br>RELATIONS<br>CONTACTOR<br>AND AND AND AND AND<br>AND AND AND AND AND<br>AND AND AND AND AND AND<br>AND AND AND AND AND AND AND AND AND AND | BaciGidlabutasivy Ende<br>CLARRIGARNT<br>BUTLERNOMODEL | ISTUTYMENT<br>TOO QUALITY<br>PRODUCTY<br>ELALSE VALUE<br>INFOLIMEETING<br>ASSEMANTE DESIGN<br>OMENDIMAL<br>CHANGES |
|--|--|---|--|--|
| NICHOLAS UMOSELLA, LEED AP   | April 12 <sup>th</sup> , 2010  | CONSTRUCTION MANAGEMENT   |  |  |

| BUILDING INDUSTRY                   | ACKNOWLEDGEMENTS   |                         |
|-------------------------------------|--|-------------------------|
| PROJECT INTRODUCTION                | Barton Malow Company   |                         |
| INTEGRATED PROJECT DELIVERY         | West Village Commons Project Team, Corinne Ambler, Bob                                 |                         |
| INTRODUCTION                        | Grottenthaler, Mark Bacha, Amy Hobbs   |                         |
| WEST VILLAGE COMMONS IPD GUIDE      | <ul> <li>Dennis Bohlayer, Towson University Facilities Management</li> </ul>           |                         |
| STRUCTURAL STRATEGY                 | Patrick Duke, KLMK Group   |                         |
| Reason for Two Systems     Redesign | • Dan Kerr, McClure Company  |                         |
| COST, DURATION                      | • My Advisor, Jim Faust  |                         |
| ENERGY STRATEGY                     | Victor Sanvido, Southland Industries   |                         |
| Central Utility Plant               | Mike Tardif, Grunley Construction     Emily Trumbull - Burdette, Koehler, Murphy, Inc. |                         |
| FACADE STRATEGY                     | Emily frumbuli - Burdette, Koenier, Murphy, Inc.     My Family and Friends             |                         |
| • EARLY INVOLVEMENT                 | Ryan Johnson, Hali Voycik, Structural AE's   |                         |
| • LAYOUT, DURATION, PHASING, COST,  | Entire Architectural Engineering Department  |                         |
| CONCLUSION                          | Penn State AE Class of 2010  |                         |
| ACKNOWLEDGEMENTS                    |  |                         |
| NICHOLAS UMOSELLA, LEED AP          | April 12 <sup>th</sup> , 2010  | CONSTRUCTION MANAGEMENT |