# Wellington Condominiums

Exton PA

Extraordinary Residences Exceptional Lifestyle

## Design and Construction Team:

**Owner:** The Hankin Group
**General Contractor:** Wellington Commercial Construction
**Construction Manager:** Wellington Commercial Construction
**Architects:** Minno & Wasko Architects and Planner
**Engineers:** Liberty Engineering

## General Scope:

**Size:** 147,069 S.F. 4 Story luxury condominiums w/ Parking Garage
**Building Cost:** $18.1 million
**Schedule:** September 2005 thru May 2007
**Project Delivery:** Design Build

## Architecture:

-Designed in the tradition of grand estate homes
-Situated at Eagleview community town center
-8 designs with a choice of décor being “traditional” or “contemporary”
-Designated areas for concerts, shopping, dining and fun
-Building surrounded by landscaped parks and native woods
-Stylish brick and cast stone exterior veneer
-Composite slate roof and membrane roof w/ copper eave drip edge

## M.E.P. Systems:

-Fire protection system includes sprinklers, fire alarms and smoke detectors throughout each residence and public areas
-Building access communication system, telephone, cable and internet ready
-HVAC is an all air gas fired furnace supplying each condominium residence
-Main Electrical Distribution switch board is 1600 Amp, 3 phase, 120/208 V
-The main electrical distribution connects to 4 meter banks which are then broken down to each individual apartments

## Construction and Structural:

-Being built in a very developed commercial neighborhood
-Geotech report indicated site had variance in quality of soils
-Installed permanent dewatering system before actual construction
-Delay in Permits and architectural approvals pushed façade construction to winter
-Foundation utilizes 18” strip and column footings w/ 5” slab on grade
-First floor makes use of a 12” heavily reinforced two way flat plate concrete slab
-Other floors use innovative Hambros Joist 3” slab on deck composite system

## Wellington Features:

-48 unique floor plans up to 2,300 S.F.
-Great views from large bay windows
-Hardwood floors in all living areas
-Polished Granite Countertops
-Elegant lobby entry

FLYNN STONE
Design and Fabrication
We Move Mountains To Satisfy You

Sean Flynn
Construction Management

www.arche.psu.edu/thesis/eportfolio/2007/portfolios/SRF163/



# Contents



# A. Executive Summary

A technical analysis in cost and construction methods of the Wellington Condominiums project was performed. An in depth study of the project schedule, site layout, and estimates were completed as follows.

The project schedule explored the details of how the building will be constructed. A focus on preconstruction and construction phases has lead the project to begin on September 26, 2005 and end on May 4, 2007. For preconstruction it takes 355 days to complete the tasks of project management, buyout, shop drawings, and fabrication. The construction phase focuses on completing the substructure, superstructure, exterior shell, interior shell, and fit out in 340 days.

The critical part of the schedule occurs when constructing the transfer slab and superstructure. It took 65 days to construct the transfer slab while the foundation and rest of the superstructure respectively took 60 and 172 days. Lost productivity is resulted from constructing the transfer slab and possible schedule reduction/acceleration and constructability review should be looked at in the near future. To make up for lost productivity and delays, a site layout plan is created for the superstructure phase. Communicating the plan to all and laying out key zones in the project site will increase safety and productivity.

An assemblies estimate for the building exterior was calculated and compared to the actual project estimate. The building exterior assemblies estimate includes: the concrete foundation wall, brick and stone cast façade, and roof. The assemblies estimate and actual project estimate are as followed respectively: $1,966,198, $1,958,226 (0.41% estimate difference). The 2006 RS Means Assemblies estimating manual was referenced to calculate the building exterior assemblies estimate.

A detailed estimate was prepared for the entire structural system. The detailed structural systems estimate and actual project estimate was compiled and are as followed: $2,359,438, $2,530,307 (0.94% estimate difference). The use of RAM Concept and 2005 Cost Works was utilized to calculate the structural systems estimate.

The general conditions for the Wellington Condominiums project were projected to be at a cost of $692,725.00. This amounts to a 3.83% cost to the entire construction project. To industry standards this is found to be resonable.



# B. Detailed Project Schedule

## B.1 Introduction

A detailed project schedule was developed for Wellington Condominiums to provide a breakdown of the construction phasing and sequencing. The project schedule begins with preconstruction on September 26, 2005 and ends on May 4, 2007 with exterior landscaping. A highlight breakdown of the project schedule is as followed:

- **Preconstruction:** *355 Days Scheduled From Sept. 26,2005 thru Feb. 5, 2007*
  - Project Management
  - Buyout
  - Shop Drawings
  - Fabrication

- **Construction:** *340 Days Scheduled From Jan. 16,2006 thru May 4, 2007*
  - Exterior
    - Site Work
    - Parking Lot
  - Substructure
    - Foundations & Columns
    - Garage Slab
    - Transfer Slab
  - Superstructure
    - Wall Panels & Hambros Composite Deck System
    - Roof Trusses and Decking
    - Arriscraft & Brickwork
  - Interior Shell
    - Non-load Bearing Partitions
    - MEP Rough-in and Distribution
    - Drywall & Finishes
  - Fit out
    - Phase 1
    - Phase 2

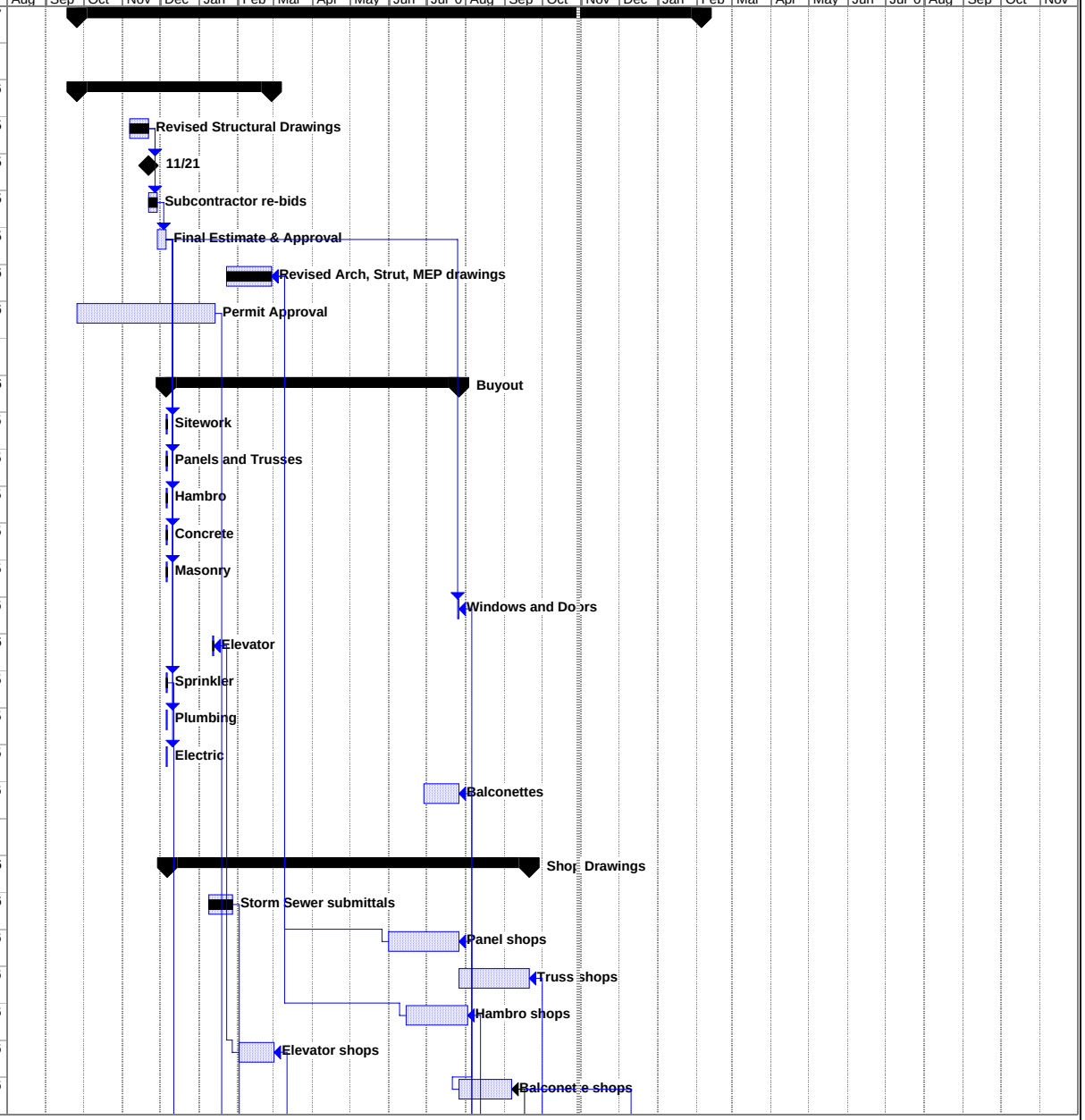


## B.2 Detailed Project Schedule

*See the Following Attached Pages*

# Wellington Condominiums Detailed Project Schedule

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | **Preconstruction** | **355 days** | **Mon 9/26/05** | **Mon 2/5/07** |
| 2 | | | | |
| 3 | **Project Management** | **111 days** | **Mon 9/26/05** | **Mon 2/27/06** |
| 4 | Revised Structural Drawings | 11 days | Mon 11/7/05 | Mon 11/21/05 |
| 5 | Re-submit for Permits | 0 days | Mon 11/21/05 | Mon 11/21/05 |
| 6 | Subcontractor re-bids | 5 days | Tue 11/22/05 | Mon 11/28/05 |
| 7 | Final Estimate & Approval | 5 days | Tue 11/29/05 | Mon 12/5/05 |
| 8 | Revised Arch, Strut, MEP drawings | 26 days | Mon 1/23/06 | Mon 2/27/06 |
| 9 | Permit Approval | 80 days | Mon 9/26/05 | Fri 1/13/06 |
| 10 | | | | |
| 11 | **Buyout** | **167 days** | **Tue 12/6/05** | **Thu 7/27/06** |
| 12 | Sitework | 1 day | Tue 12/6/05 | Tue 12/6/05 |
| 13 | Panels and Trusses | 1 day | Tue 12/6/05 | Tue 12/6/05 |
| 14 | Hambro | 1 day | Tue 12/6/05 | Tue 12/6/05 |
| 15 | Concrete | 1 day | Tue 12/6/05 | Tue 12/6/05 |
| 16 | Masonry | 1 day | Tue 12/6/05 | Tue 12/6/05 |
| 17 | Windows and Doors | 1 day | Wed 7/26/06 | Thu 7/27/06 |
| 18 | Elevator | 1 day | Thu 1/12/06 | Fri 1/13/06 |
| 19 | Sprinkler | 1 day | Tue 12/6/05 | Tue 12/6/05 |
| 20 | Plumbing | 1 day | Tue 12/6/05 | Tue 12/6/05 |
| 21 | Electric | 1 day | Tue 12/6/05 | Tue 12/6/05 |
| 22 | Balconettes | 20 days | Thu 6/29/06 | Thu 7/27/06 |
| 23 | | | | |
| 24 | **Shop Drawings** | **206 days** | **Wed 12/7/05** | **Thu 9/21/06** |
| 25 | Storm Sewer submittals | 15 days | Mon 1/9/06 | Fri 1/27/06 |
| 26 | Panel shops | 40 days | Thu 6/1/06 | Thu 7/27/06 |
| 27 | Truss shops | 40 days | Thu 7/27/06 | Thu 9/21/06 |
| 28 | Hambro shops | 35 days | Thu 6/15/06 | Thu 8/3/06 |
| 29 | Elevator shops | 20 days | Thu 2/2/06 | Thu 3/2/06 |
| 30 | Balconette shops | 30 days | Thu 7/27/06 | Thu 9/7/06 |

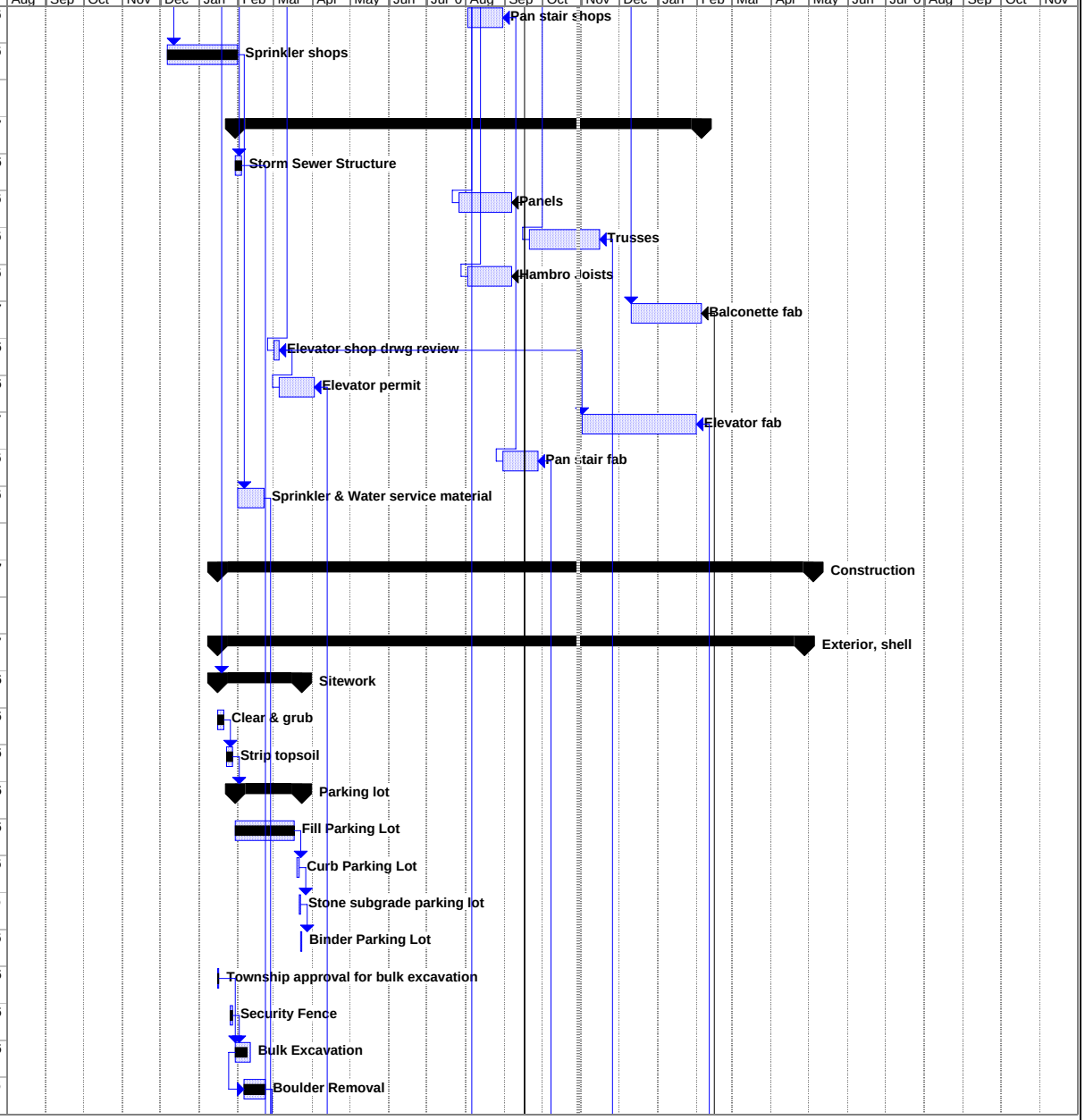



Project: Wellington Condominiums
Date: 10/30/06

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

# Wellington Condominiums Detailed Project Schedule

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 31 | Pan stair shops | 20 days | Thu 8/3/06 | Thu 8/31/06 |
| 32 | Sprinkler shops | 40 days | Wed 12/7/05 | Tue 1/31/06 |
| 33 | | | | |
| 34 | **Fabrication** | **265 days** | **Mon 1/30/06** | **Mon 2/5/07** |
| 35 | Storm Sewer Structure | 5 days | Mon 1/30/06 | Fri 2/3/06 |
| 36 | Panels | 30 days | Thu 7/27/06 | Thu 9/7/06 |
| 37 | Trusses | 40 days | Thu 9/21/06 | Thu 11/16/06 |
| 38 | Hambro Joists | 25 days | Thu 8/3/06 | Thu 9/7/06 |
| 39 | Balconette fab | 40 days | Mon 12/11/06 | Mon 2/5/07 |
| 40 | Elevator shop drwg review | 2 days | Thu 3/2/06 | Mon 3/6/06 |
| 41 | Elevator permit | 20 days | Mon 3/6/06 | Mon 4/3/06 |
| 42 | Elevator fab | 65 days | Thu 11/2/06 | Thu 2/1/07 |
| 43 | Pan stair fab | 20 days | Thu 8/31/06 | Thu 9/28/06 |
| 44 | Sprinkler & Water service material | 15 days | Wed 2/1/06 | Tue 2/21/06 |
| 45 | | | | |
| 46 | **Construction** | **340 days** | **Mon 1/16/06** | **Fri 5/4/07** |
| 47 | | | | |
| 48 | **Exterior, shell** | **335 days** | **Mon 1/16/06** | **Fri 4/27/07** |
| 49 | **Sitework** | **49 days** | **Mon 1/16/06** | **Thu 3/23/06** |
| 50 | Clear & grub | 5 days | Mon 1/16/06 | Fri 1/20/06 |
| 51 | Strip topsoil | 5 days | Mon 1/23/06 | Fri 1/27/06 |
| 52 | **Parking lot** | **39 days** | **Mon 1/30/06** | **Thu 3/23/06** |
| 53 | Fill Parking Lot | 35 days | Mon 1/30/06 | Fri 3/17/06 |
| 54 | Curb Parking Lot | 2 days | Mon 3/20/06 | Tue 3/21/06 |
| 55 | Stone subgrade parking lot | 1 day | Wed 3/22/06 | Wed 3/22/06 |
| 56 | Binder Parking Lot | 1 day | Thu 3/23/06 | Thu 3/23/06 |
| 57 | Township approval for bulk excava | 1 day | Mon 1/16/06 | Mon 1/16/06 |
| 58 | Security Fence | 2 days | Thu 1/26/06 | Fri 1/27/06 |
| 59 | Bulk Excavation | 10 days | Mon 1/30/06 | Fri 2/10/06 |
| 60 | Boulder Removal | 13 days | Mon 2/6/06 | Wed 2/22/06 |

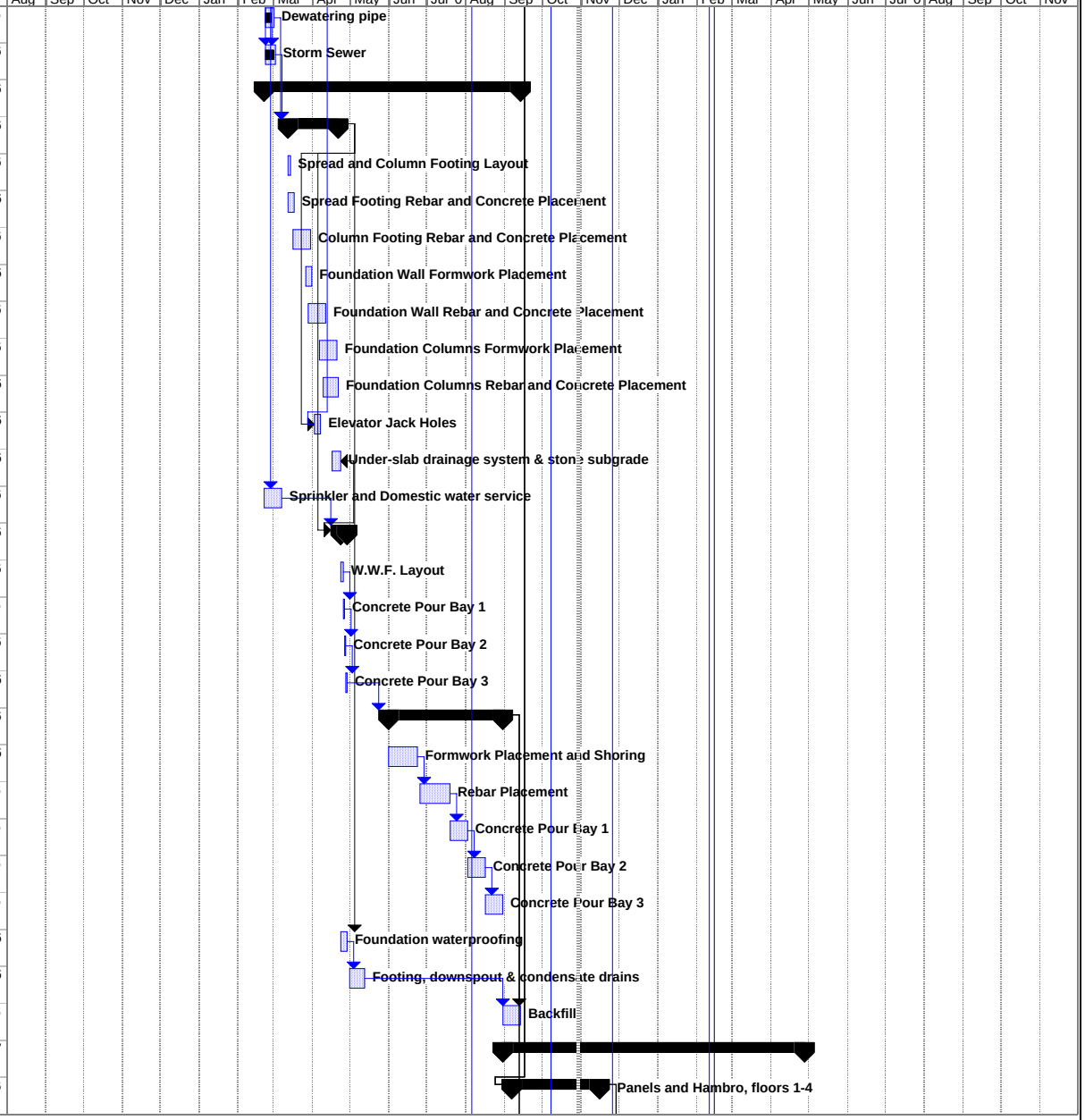



Project: Wellington Condominiums
Date: 10/30/06

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

Wellington Condominiums Detailed Project Schedule

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 61 | Dewatering pipe | 5 days | Thu 2/23/06 | Wed 3/1/06 |
| 62 | Storm Sewer | 6 days | Thu 2/23/06 | Thu 3/2/06 |
| 63 | **Substructure** | **146 days** | **Wed 2/22/06** | **Wed 9/13/06** |
| 64 | **Foundation & Columns** | **30 days** | **Mon 3/13/06** | **Fri 4/21/06** |
| 65 | Spread and Column Footing l | 2 days | Mon 3/13/06 | Tue 3/14/06 |
| 66 | Spread Footing Rebar and Cc | 5 days | Mon 3/13/06 | Fri 3/17/06 |
| 67 | Column Footing Rebar and C | 10 days | Fri 3/17/06 | Thu 3/30/06 |
| 68 | Foundation Wall Formwork Pl | 5 days | Mon 3/27/06 | Fri 3/31/06 |
| 69 | Foundation Wall Rebar and C | 10 days | Wed 3/29/06 | Tue 4/11/06 |
| 70 | Foundation Columns Formwo | 10 days | Fri 4/7/06 | Thu 4/20/06 |
| 71 | Foundation Columns Rebar a | 10 days | Mon 4/10/06 | Fri 4/21/06 |
| 72 | Elevator Jack Holes | 5 days | Mon 4/3/06 | Fri 4/7/06 |
| 73 | Under-slab drainage system & sto | 5 days | Mon 4/17/06 | Mon 4/24/06 |
| 74 | Sprinkler and Domestic water serv | 10 days | Wed 2/22/06 | Tue 3/7/06 |
| 75 | **Garage Slab** | **5 days** | **Mon 4/24/06** | **Fri 4/28/06** |
| 76 | W.W.F. Layout | 2 days | Mon 4/24/06 | Tue 4/25/06 |
| 77 | Concrete Pour Bay 1 | 1 day | Wed 4/26/06 | Wed 4/26/06 |
| 78 | Concrete Pour Bay 2 | 1 day | Thu 4/27/06 | Thu 4/27/06 |
| 79 | Concrete Pour Bay 3 | 1 day | Fri 4/28/06 | Fri 4/28/06 |
| 80 | **Transfer Slab** | **65 days** | **Thu 6/1/06** | **Wed 8/30/06** |
| 81 | Formwork Placement and Sh | 17 days | Thu 6/1/06 | Fri 6/23/06 |
| 82 | Rebar Placement | 18 days | Mon 6/26/06 | Wed 7/19/06 |
| 83 | Concrete Pour Bay 1 | 10 days | Thu 7/20/06 | Wed 8/2/06 |
| 84 | Concrete Pour Bay 2 | 10 days | Thu 8/3/06 | Wed 8/16/06 |
| 85 | Concrete Pour Bay 3 | 10 days | Thu 8/17/06 | Wed 8/30/06 |
| 86 | Foundation waterproofing | 5 days | Mon 4/24/06 | Fri 4/28/06 |
| 87 | Footing, downspout & condensate | 10 days | Mon 5/1/06 | Fri 5/12/06 |
| 88 | Backfill | 10 days | Thu 8/31/06 | Wed 9/13/06 |
| 89 | **Superstructure** | **172 days** | **Thu 8/31/06** | **Fri 4/27/07** |
| 90 | **Panels and Hambro, floors 1-4** | **50 days** | **Thu 9/7/06** | **Wed 11/15/06** |

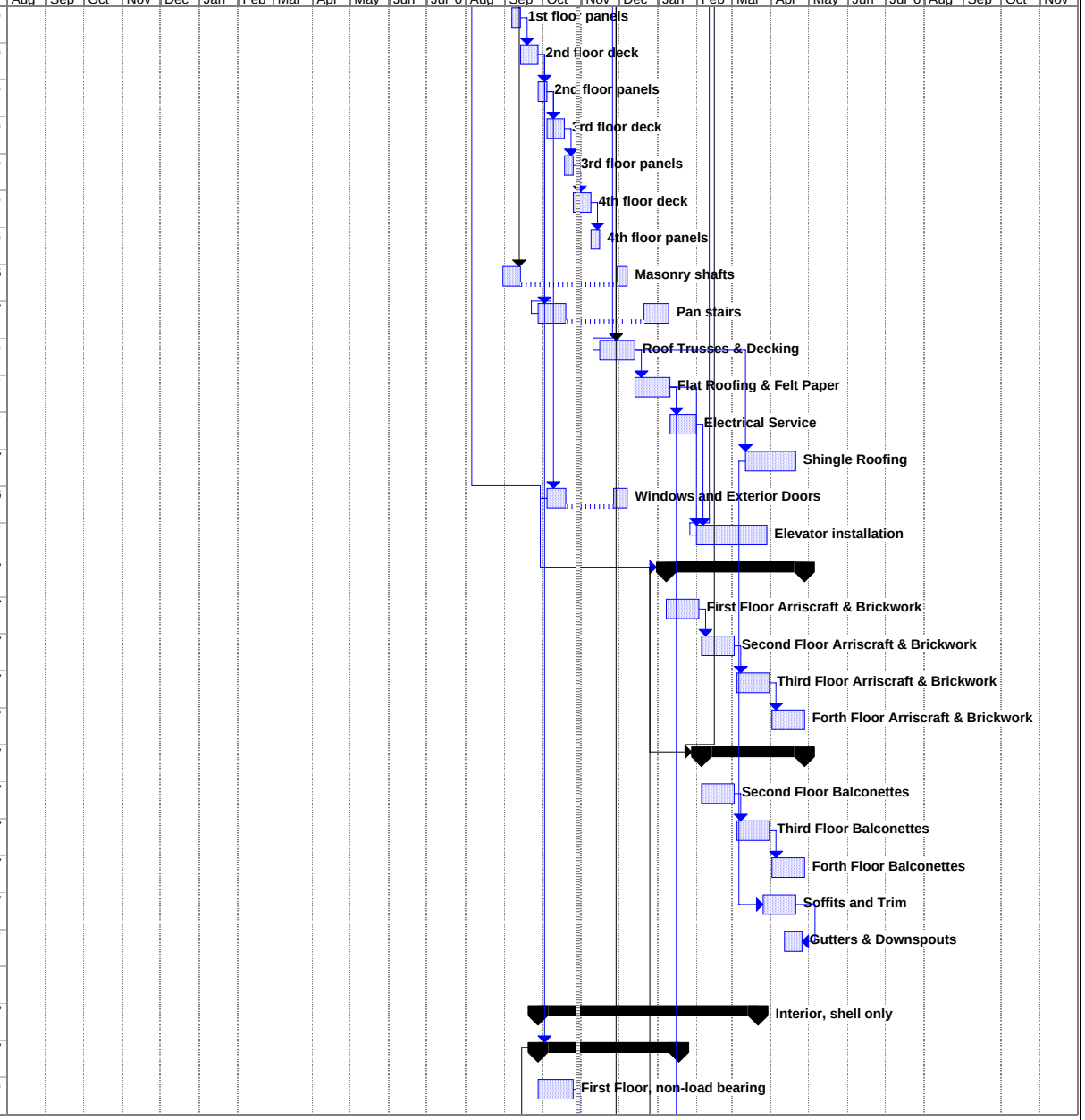



Project: Wellington Condominiums
Date: 10/30/06

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

# Wellington Condominiums Detailed Project Schedule

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 91 | 1st floor panels | 5 days | Thu 9/7/06 | Wed 9/13/06 |
| 92 | 2nd floor deck | 10 days | Thu 9/14/06 | Wed 9/27/06 |
| 93 | 2nd floor panels | 5 days | Thu 9/28/06 | Wed 10/4/06 |
| 94 | 3rd floor deck | 10 days | Thu 10/5/06 | Wed 10/18/06 |
| 95 | 3rd floor panels | 5 days | Thu 10/19/06 | Wed 10/25/06 |
| 96 | 4th floor deck | 10 days | Thu 10/26/06 | Wed 11/8/06 |
| 97 | 4th floor panels | 5 days | Thu 11/9/06 | Wed 11/15/06 |
| 98 | Masonry shafts | 16 days | Thu 8/31/06 | Thu 12/7/06 |
| 99 | Pan stairs | 30 days | Thu 9/28/06 | Tue 1/9/07 |
| 100 | Roof Trusses & Decking | 20 days | Thu 11/16/06 | Wed 12/13/06 |
| 101 | Flat Roofing & Felt Paper | 20 days | Thu 12/14/06 | Wed 1/10/07 |
| 102 | Electrical Service | 15 days | Thu 1/11/07 | Wed 1/31/07 |
| 103 | Shingle Roofing | 30 days | Mon 3/12/07 | Fri 4/20/07 |
| 104 | Windows and Exterior Doors | 20 days | Thu 10/5/06 | Thu 12/7/06 |
| 105 | Elevator installation | 40 days | Thu 2/1/07 | Wed 3/28/07 |
| 106 | **Arriscraft & Brickwork** | **80 days** | **Mon 1/8/07** | **Fri 4/27/07** |
| 107 | First Floor Arriscraft & Brickw | 20 days | Mon 1/8/07 | Fri 2/2/07 |
| 108 | Second Floor Arriscraft & Bric | 20 days | Mon 2/5/07 | Fri 3/2/07 |
| 109 | Third Floor Arriscraft & Brickw | 20 days | Mon 3/5/07 | Fri 3/30/07 |
| 110 | Forth Floor Arriscraft & Brickv | 20 days | Mon 4/2/07 | Fri 4/27/07 |
| 111 | **Install balconettes** | **60 days** | **Mon 2/5/07** | **Fri 4/27/07** |
| 112 | Second Floor Balconettes | 20 days | Mon 2/5/07 | Fri 3/2/07 |
| 113 | Third Floor Balconettes | 20 days | Mon 3/5/07 | Fri 3/30/07 |
| 114 | Forth Floor Balconettes | 20 days | Mon 4/2/07 | Fri 4/27/07 |
| 115 | Soffits and Trim | 20 days | Mon 3/26/07 | Fri 4/20/07 |
| 116 | Gutters & Downspouts | 10 days | Thu 4/12/07 | Wed 4/25/07 |
| 117 | | | | |
| 118 | **Interior, shell only** | **125 days** | **Thu 9/28/06** | **Wed 3/21/07** |
| 119 | **Partitions, non-load bearing** | **80 days** | **Thu 9/28/06** | **Wed 1/17/07** |
| 120 | First Floor, non-load bearing | 20 days | Thu 9/28/06 | Wed 10/25/06 |




Project: Wellington Condominiums
Date: 10/30/06

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

# Wellington Condominiums Detailed Project Schedule

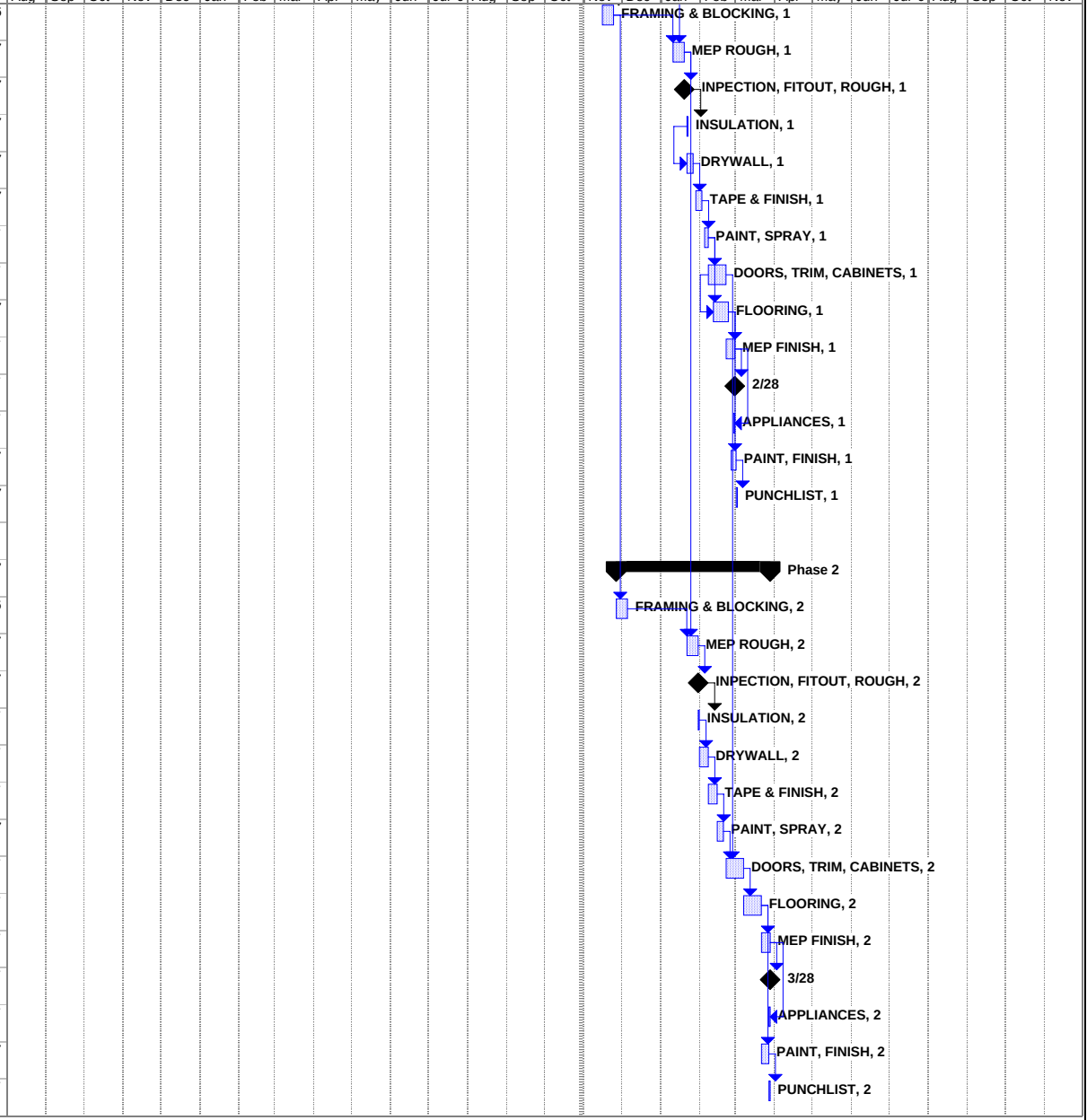
| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 121 | Second Floor, non-load bearing | 20 days | Thu 10/26/06 | Wed 11/22/06 |
| 122 | Third Floor, non-load bearing | 20 days | Thu 11/23/06 | Wed 12/20/06 |
| 123 | Forth Floor, non-load bearing | 20 days | Thu 12/21/06 | Wed 1/17/07 |
| 124 | **MEP rough-in & Distribution** | **80 days** | **Thu 11/9/06** | **Wed 2/28/07** |
| 125 | First Floor MEP rough-in | 10 days | Thu 11/9/06 | Wed 11/22/06 |
| 126 | First Floor Distribution | 10 days | Thu 11/23/06 | Wed 12/6/06 |
| 127 | Second Floor MEP rough-in | 10 days | Thu 12/7/06 | Wed 12/20/06 |
| 128 | Second Floor Distribution | 10 days | Thu 12/21/06 | Wed 1/3/07 |
| 129 | Third Floor MEP rough-in | 10 days | Thu 1/4/07 | Wed 1/17/07 |
| 130 | Third Floor Distribution | 10 days | Thu 1/18/07 | Wed 1/31/07 |
| 131 | Forth Floor MEP rough-in | 10 days | Thu 2/1/07 | Wed 2/14/07 |
| 132 | Forth Floor Distribution | 10 days | Thu 2/15/07 | Wed 2/28/07 |
| 133 | **Drywall & Finishing** | **40 days** | **Thu 1/11/07** | **Wed 3/7/07** |
| 134 | First Floor Drywall & Finishing | 10 days | Thu 1/11/07 | Wed 1/24/07 |
| 135 | Second Floor Drywall & Finishing | 10 days | Thu 1/25/07 | Wed 2/7/07 |
| 136 | Third Floor Drywall & Finishing | 10 days | Thu 2/8/07 | Wed 2/21/07 |
| 137 | Forth Floor Drywall & Finishing | 10 days | Thu 2/22/07 | Wed 3/7/07 |
| 138 | Paint | 30 days | Thu 2/1/07 | Wed 3/14/07 |
| 139 | Doors, Frames, Hardware | 30 days | Thu 2/8/07 | Wed 3/21/07 |
| 140 | | | | |
| 141 | **Exterior** | **55 days** | **Mon 2/19/07** | **Fri 5/4/07** |
| 142 | Site lighting, rough-in | 10 days | Mon 2/19/07 | Mon 3/5/07 |
| 143 | Sidewalks | 10 days | Mon 3/5/07 | Fri 3/16/07 |
| 144 | Pavers | 10 days | Mon 3/19/07 | Fri 3/30/07 |
| 145 | Paving | 10 days | Mon 4/2/07 | Fri 4/13/07 |
| 146 | Landscaping | 15 days | Mon 4/16/07 | Fri 5/4/07 |
| 147 | | | | |
| 148 | **FITOUT** | **95 days** | **Thu 11/16/06** | **Wed 3/28/07** |
| 149 | | | | |
| 150 | **Phase 1** | **77 days** | **Thu 11/16/06** | **Fri 3/2/07** |


Project: Wellington Condominiums
Date: 10/30/06

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

# Wellington Condominiums Detailed Project Schedule

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 151 | FRAMING & BLOCKING, 1 | 7 days | Thu 11/16/06 | Fri 11/24/06 |
| 152 | MEP ROUGH, 1 | 7 days | Thu 1/11/07 | Fri 1/19/07 |
| 153 | INPECTION, FITOUT, ROUGH, 1 | 0 days | Fri 1/19/07 | Fri 1/19/07 |
| 154 | INSULATION, 1 | 1 day | Mon 1/22/07 | Mon 1/22/07 |
| 155 | DRYWALL, 1 | 5 days | Mon 1/22/07 | Fri 1/26/07 |
| 156 | TAPE & FINISH, 1 | 5 days | Mon 1/29/07 | Fri 2/2/07 |
| 157 | PAINT, SPRAY, 1 | 3 days | Mon 2/5/07 | Wed 2/7/07 |
| 158 | DOORS, TRIM, CABINETS, 1 | 10 days | Thu 2/8/07 | Wed 2/21/07 |
| 159 | FLOORING, 1 | 10 days | Mon 2/12/07 | Fri 2/23/07 |
| 160 | MEP FINISH, 1 | 5 days | Thu 2/22/07 | Wed 2/28/07 |
| 161 | INSPECTION, FITOUT, FINAL, 2 | 0 days | Wed 2/28/07 | Wed 2/28/07 |
| 162 | APPLIANCES, 1 | 1 day | Wed 2/28/07 | Wed 2/28/07 |
| 163 | PAINT, FINISH, 1 | 4 days | Mon 2/26/07 | Thu 3/1/07 |
| 164 | PUNCHLIST, 1 | 1 day | Fri 3/2/07 | Fri 3/2/07 |
| 165 | | | | |
| 166 | **Phase 2** | **88 days** | **Mon 11/27/06** | **Wed 3/28/07** |
| 167 | FRAMING & BLOCKING, 2 | 7 days | Mon 11/27/06 | Tue 12/5/06 |
| 168 | MEP ROUGH, 2 | 7 days | Mon 1/22/07 | Tue 1/30/07 |
| 169 | INPECTION, FITOUT, ROUGH, 2 | 0 days | Tue 1/30/07 | Tue 1/30/07 |
| 170 | INSULATION, 2 | 1 day | Wed 1/31/07 | Wed 1/31/07 |
| 171 | DRYWALL, 2 | 5 days | Thu 2/1/07 | Wed 2/7/07 |
| 172 | TAPE & FINISH, 2 | 5 days | Thu 2/8/07 | Wed 2/14/07 |
| 173 | PAINT, SPRAY, 2 | 3 days | Thu 2/15/07 | Mon 2/19/07 |
| 174 | DOORS, TRIM, CABINETS, 2 | 10 days | Thu 2/22/07 | Wed 3/7/07 |
| 175 | FLOORING, 2 | 10 days | Thu 3/8/07 | Wed 3/21/07 |
| 176 | MEP FINISH, 2 | 5 days | Thu 3/22/07 | Wed 3/28/07 |
| 177 | INSPECTION, FITOUT, FINAL, 2 | 0 days | Wed 3/28/07 | Wed 3/28/07 |
| 178 | APPLIANCES, 2 | 1 day | Wed 3/28/07 | Wed 3/28/07 |
| 179 | PAINT, FINISH, 2 | 4 days | Thu 3/22/07 | Tue 3/27/07 |
| 180 | PUNCHLIST, 2 | 1 day | Wed 3/28/07 | Wed 3/28/07 |




Project: Wellington Condominiums
Date: 10/30/06

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone



## B.3 Brief Analysis

### B.3.1 Critical Point in Schedule

The detailed project schedule breaks down how the project will flow throughout construction. The transfer slab is a key transition point to the flow and sequence of the project. It takes the project team 65 days to complete the 12" thick 6,000 PSI strength concrete pour versus only spending 60 days to complete the entire foundation systems. If a schedule reduction or acceleration is needed on this project the transfer slab would be the first sequence that should be looked at. After the completion of the foundation and transfer slab sequence, the 4 story superstructure takes 172 days to complete.

### B.3.2 Phase 1 and 2

Near the end of completion before handover, a phase 1 and phase 2 are established on the project schedule. Phase 1 and 2 include final framing, rough-in, finishes, and punch list. After the main load bearing walls and MEP rough-in and distributions are installed these phases are then utilized. As seen in the diagram below, the structure is cut into two work zones named phase 1 and phase 2. Phase 1 begins trades on the first floor and then moves floor to floor completing condominiums only in the area highlighted. Phase 2 is scheduled to start and finish 28 days after phase 1. The project team decided to do this to speed up the time for handover and make one of the condominiums a show room for potential home owners. Caution must be taken when trying to accelerate the schedule and setting up phases like this. Home owners will be moving and living in phase 1 potentially while construction is in the process of phase 2. How a worker enters the space and how is each room and floor sequenced are questions that the project team must pay attention to when constructing.

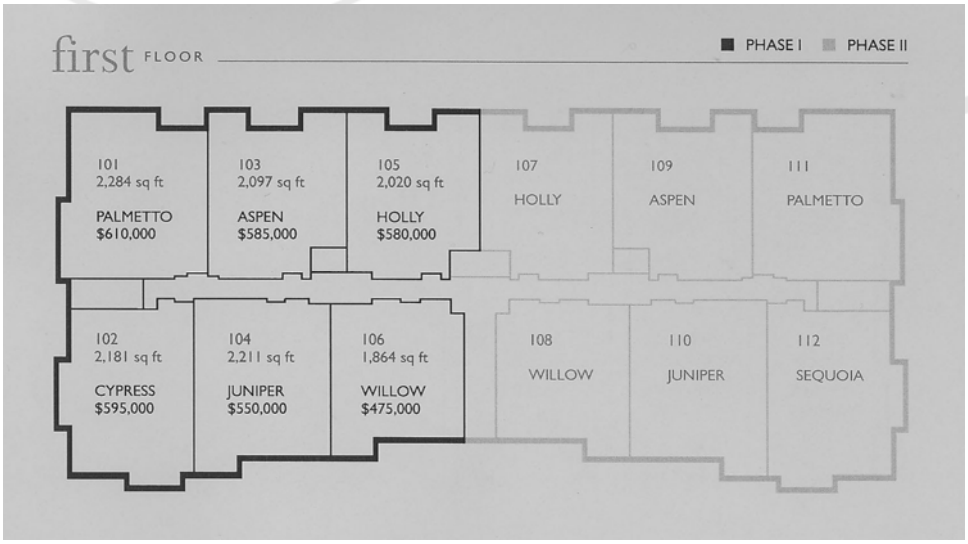



**Figure 1: First Floor Phase 1 and 2 – Wellington Commercial Construction**



### B.3.3 Project Delays

The project schedule attached is an updated best case scenario for the project to be completed. The project team has faced many challenges and has delayed the schedule numerous times. Some of the reasons why the schedule has been delayed are as followed:

- Poor Subsurface Conditions
- Architect and Local Township Approvals
- Change Orders by Owner
- Learning curve to installing new Hambros Joist Composite Deck System

# C. Site Layout Planning

## C.1 Introduction

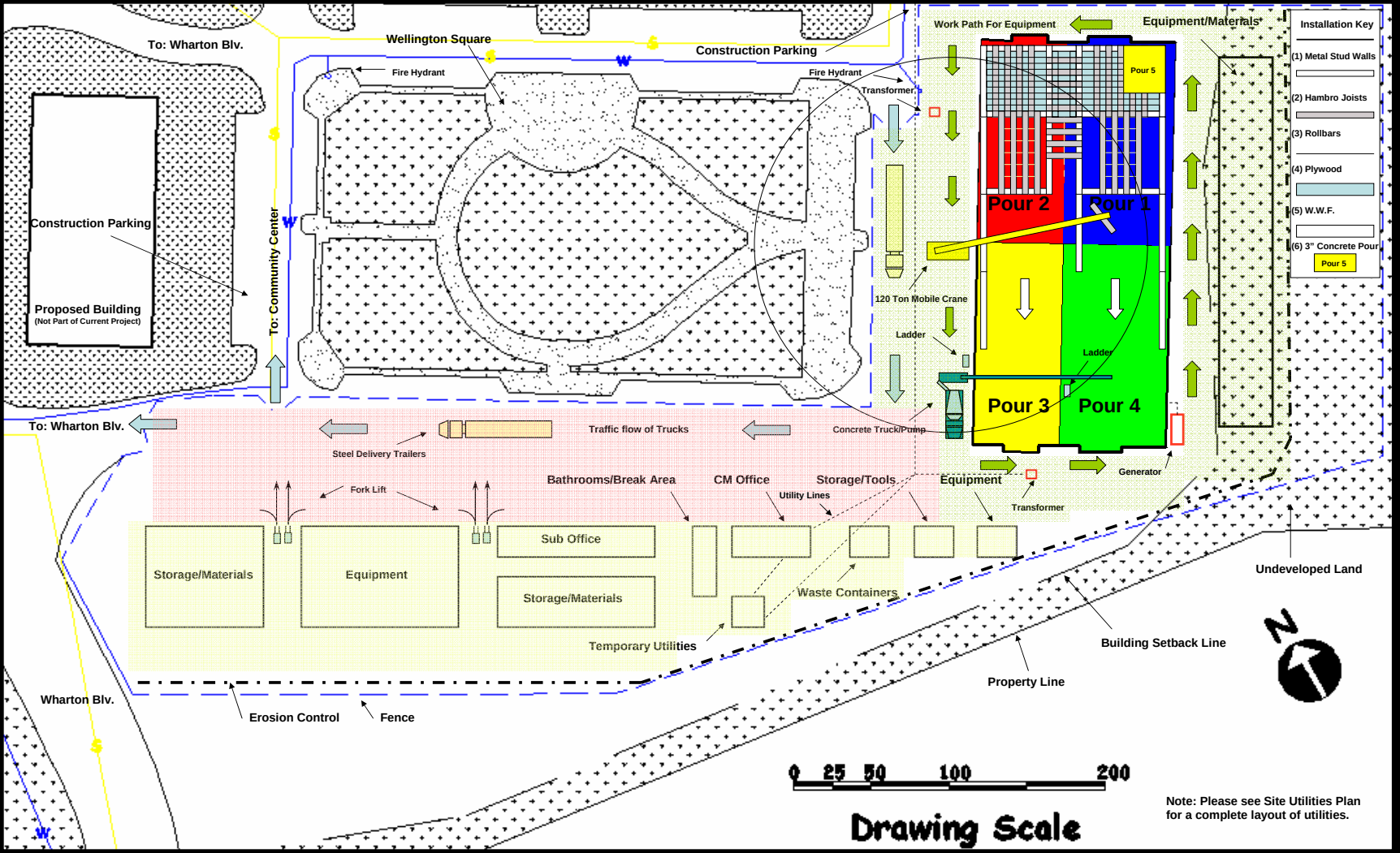
A more in depth study of the superstructure phase was utilized through the use of a site plan. The critical phase of the Wellington Condominiums project is the construction of the first floor transfer slab and installation of a repeated load bearing stud walls and Hambros joist composite deck system. Sixty five days are spent constructing the transfer slab and the project has before been delayed on numerous occasions. At the current time it was imperative for the project team to be efficient and accelerate the schedule to get back on track. A good way of proper site planning and organization is to sequence the work through the use of a site plan

.



## C.2 Superstructure Phased Site Plan

*See the Following Attached Page*



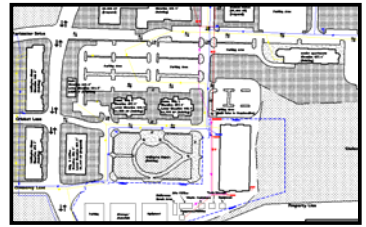

# Wellington Condominiums Site Layout

## Superstructure Construction Analysis

Uwchlan Township – Chester County - Pennsylvania

Sean Flynn – Construction Management

October 30, 2006 Revision #001



### Wellington Condominium Zones

- Unloading and Vehicle Traffic Zone
- Storage/Equipment/Offices Zone
- Construction Zone



## C.3 Brief Analysis

### C.3.1 Key Site Project Zones

The superstructure phased site plan has three main zones named: the unloading and traffic vehicle zone, the storage/equipment/office zone, and the construction zone. These zones offer different functions to the job site for safety and organization. The proper layout of material/equipment/vehicle pathways and sequencing of work is critical to the success of improving productivity on the project site. Needed equipment, tools, and material are placed in each zone by the management team to ensure that crews do not have to travel from one side of the site to the other. All other materials that are not needed are secured in designated storage areas.

### C.3.2 Superstructure Sequence

The superstructure phase can be broken down to three main stages of construction. The first stage is doing the floor pour. A concrete pump is used around the entire structure pouring the 4 bays. The concrete pours work in a counterclockwise fashion from the north east corner of the construction zone. The concrete pump and trucks work around the site as noted in the site layout plan till all pours have been completed. Once the concrete pour is completed a 120 ton crane is then positioned on the north side of the building structure to place load bearing metal stud walls. The walls are sequenced and placed so that the crane can easily pick them up and bolt/weld into place without wasting time. The flow of work in placing the metal studs and future construction work will go from the north to the south side of the structure. After the metal studs are in place the Hambros joist composite deck system can be installed as detailed in the site layout plan. This work flow sequence of concrete pours, stud wall placement, and composite deck system will continued right through to the forth floor. Initially a learning curve for the crew is to be expected with the new composite deck system and work sequence. As construction continues the project team expects productivity to increase and schedule time savings.

### C.3.3 Critique of Contractor Layout

The site layout utilized by the contractor at this current stage has worked fairly well. When at the project site, the delivery truck drivers and construction workers felt that the site layout did the job. Delivery trucks come from the north end entrance and get unloaded at the construction zone or the designated unloading and vehicle traffic zone. Once the truck is unloaded they proceed to exit out the west side of the site without having to turn around. Construction workers did not have a problem when it came to parking. Ample parking spaces surround the construction site allowing the flexibility of workers to park wherever they see fit. The project management team reorganized the schedule to build the parking lot before construction started. The general consensus by

many construction workers is that the additional parking lot has made work on the construction site much more productive.

Some of the areas that I can see improvements in are accessibility to floor work zones and waste removal. As noted in the attached site layout plan there are only two ladder access points for workers to reach above grade levels. Both ladders being on the south east side of the structure. The project site should have more ways of easily moving up and down floors while construction is underway. Workers trying to hall equipment back and forth everyday can create issues and lost productivity time. By placing material hoists or more ladders around the structure, it will inhibit more productivity and worker morale. Another issue is waste removal on the project site. The waste containers are located on the south side of the project site. This means that any waste must be haled to this location for removal. If these waste containers are put on either end of the job site, less hauling would have to be required by equipment.

# D. Assemblies Estimate

## D.1 Introduction

An assembly's estimate was created for the building envelope system. The estimate includes: the concrete foundation, brick and cast stone façade, doors and windows, and roof skin composition. The estimate was broken down with reference to 2006 RS Means Assemblies Estimating Guide. A location factor was applied to the estimate for Allentown, PA for each category as listed in the attached assemblies estimate.



## D.2 Building Envelope Assemblies Estimate

*See the Following Attached Pages*

| **Estimating Form** | | **Project Summary** | |
|---|---|---|---|
| PROJECT | Wellington Condominiums | TOTAL SITE AREA | 5.88 Acres |
| BUILDING TYPE | Residential | OWNER | Hankin Group |
| LOCATION | Exton PA | ARCHITECT | Minno & Wasko |
| DATE OF CONSTRUCTION | Spring '06 - Spring '07 | ESTIMATED CONSTRUCTION PERIOD | 18 Months |
| BRIEF DESCRIPTION | | | |
| | Wellington Condominiums is a 4 story luxery complex that houses a parking garage on the ground level. The 147,069 SF condominium project features a concrete substructure followed by a series of Hambros Joist 3" Slab on Deck Composite System. The roof system utilizes a single ply EPDM roofing membrane and slate roof system supporting by metal rafters. | | |

***Assemblies Estimate - Wellington Condominiums Building Envelope***

**Estimating Form** | **Systems Costs**

| Qty | Assembly Number | Description | Unit | Mat. | Inst. | Total | Zip Code Prefix | Type | Release | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| **B20 Exterior Closure** | | | | | | | | | | |
| 9,312.000 | B20101017600 | Conc wall reinforced, 8' high, 12" thick, plain finish, 5000 PSI | S.F. | 63,787.20 | 142,939.20 | 206,726.40 | 181 | Open | 2006 | Walls are 12' high, 6000 PSI Strength |
| 670.910 | B20101023000 | Flt precast conc,4" thick,5x18',smooth gray,low rise | S.F. | 4,193.19 | 2,475.66 | 6,668.85 | 181 | Open | 2006 | |
| 8,998.600 | B20101023150 | Flt precast conc,4" thick,12x20',smooth gray,low rise | S.F. | 79,187.68 | 9,898.46 | 89,086.14 | 181 | Open | 2006 | |
| 14,588.330 | B20101305200 | Brk vnr/met std bkup,std face,20gax3-5/8"nlb std,16" OC sp,rnng bnd | S.F. | 86,071.15 | 199,860.12 | 285,931.27 | 181 | Open | 2006 | 22 Gage studs utilized |
| 350.000 | B20201046350 | Windows,steel,csmt,insul gl,5'-11" x 5'-2",3 lite | Ea. | 586,250.00 | 154,000.00 | 740,250.00 | 181 | Open | 2006 | Average window size |
| 221.000 | B20302102500 | Doors,birch,solid core,single door,hinged,3'-0" x 7'-0" opening | Opng. | 226,525.00 | 54,587.00 | 281,112.00 | 181 | Open | 2006 | |
| **B30 Roofing** | | | | | | | | | | |
| 7,289.000 | B30101202000 | Sgl ply memb, EPDM, 45mils, fully adhered | S.F. | 6,195.65 | 5,758.31 | 11,953.96 | 181 | Open | 2006 | |
| 25,018.000 | B30101402800 | Slate roofing, 4" min slope, shingles, 3/16" thick, 8.0 PSF | S.F. | 162,617.00 | 61,043.92 | 223,660.92 | 181 | Open | 2006 | |
| 7,289.000 | B30104300700 | Flashing,copper,no backing,16 oz,< 500 lbs | S.F. | 22,158.56 | 26,313.29 | 48,471.85 | 181 | Open | 2006 | 6" Half round copper gutter |
| 776.000 | B30106103300 | Gutters,half round,copper,16 oz thick,5",mill finish | L.F. | 4,462.00 | 3,360.08 | 7,822.08 | 181 | Open | 2006 | |
| 1,395.875 | B30106200700 | Downspouts,copper,rectangular corr,3"x4",mill,16 oz thick | V.L.F. | 7,049.17 | 4,997.23 | 12,046.40 | 181 | Open | 2006 | |
| 1.000 | B30202100200 | Roof hatches, with curb, and 1" fiberglass insulation, 2'-6"x3'-0",al | Opng. | 605.00 | 172.00 | 777.00 | 181 | Open | 2006 | |
| | | **Totals** | | **$1,249,101.59** | **$665,405.27** | **$1,914,506.86** | | | | |
| | | | | x | x | x | | | | |
| | | **Allentown PA location factor multiplier** | | 0.98 | 1.074 | 1.027 | | | | |
| | | | | **$1,224,119.56** | **$714,645.26** | **$1,966,198.55** | | | | |



## D.3 Brief Analysis

### D.3.1 Assumptions

List of the following assumptions has been made for the attached assemblies estimate and is as followed:

- Doors and Windows are similar in size and composition
- The building is rectangular in form with no other façade protrusions
- All material and equipment needed for installation are included
- Concrete walls are 12’ and not 8’ in height
- Metal stud walls are 22 gage not 20 gage in composition
- Copper Gutters are 6” half round not 5” half round

### D.3.2 Comparison of Assemblies Estimate v. Actual Project Estimate

The total amount for the assemblies and actual estimates are listed as followed:

- Assemblies Estimate: $1,966,198.55 = $13.37 / SF
- Actual Project Estimate: $1,958,226.00 = $13.32 / SF
- Estimate Difference: $7,972.55 = 0.41%

# E. Detailed Structural Systems Estimate

## E.1 Introduction

An estimate for the cost of the entire superstructure was analyzed for the structural systems analyses. To calculate more accurately the amount of formwork, rebar, and concrete utilized on the substructure a program called RAM Concept was utilized. A 3D model of the structural system was developed to calculate more accurately the system. A further constructability review of the transfer slab is of great interest. It is hoped that the program will be utilized on whether or not the slab can be reduced in size and schedule. Below are figures of the RAM Concept program utilized for the detailed structural systems estimate. The superstructure of the building was calculated manually with the guide of 2005 Cost Works software.



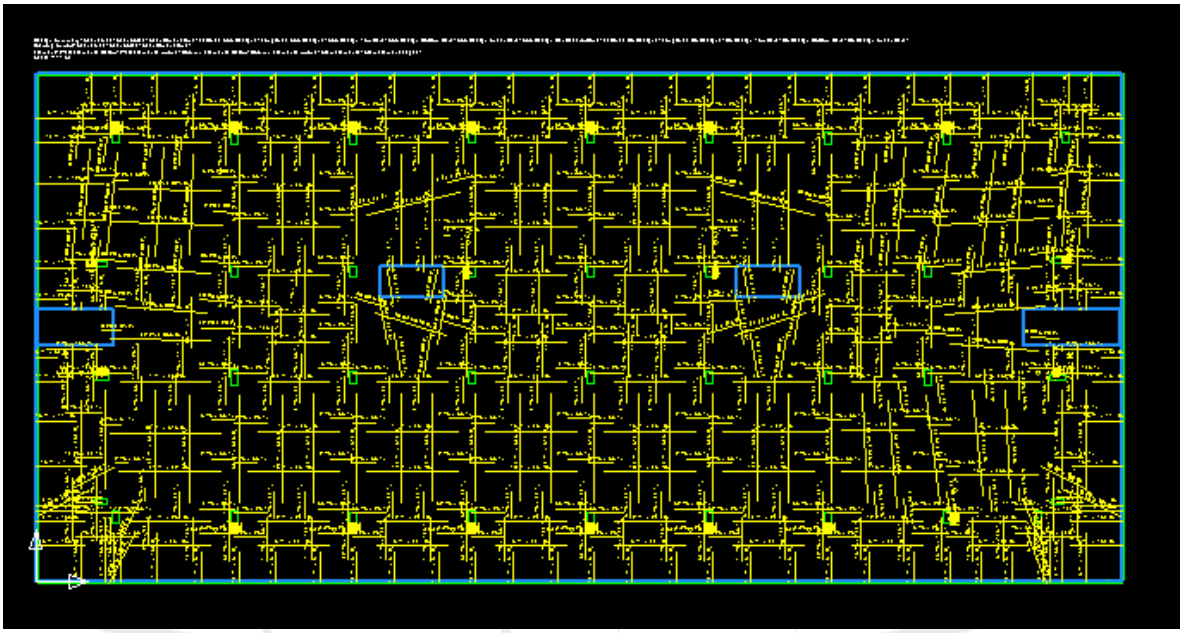


**Figure 2: Transfer Slab Rebar Placement – RAM**

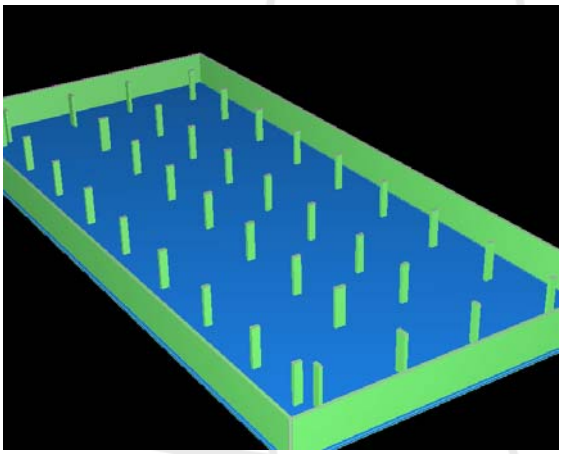


**Figure 3: Foundation – RAM Concept**

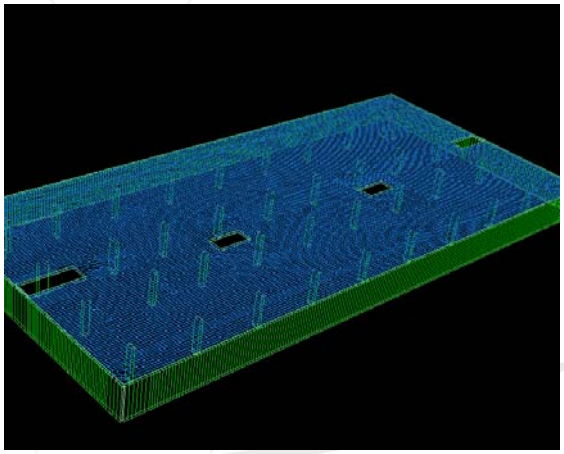


**Figure 4: Transfer Slab – RAM Concept**



## E.2 Detailed Structural Systems Estimate

*See the Following Attached Pages*

**Total Unit Costs** — **Foundations, Substructure, Superstructure**

| Qty | CSI Number | Description | Total |
|---|---|---|---|
| **Division 3 Concrete - Forms and Accessories** | | | |
| 1.000 | 31104107750 | C.I.P. concrete forms, column, square, steel framed plywood, 24" x 24", rent, 4 uses per month, includes erecting, bracing, stripping and cleaning | $14,951.04 |
| 1.000 | 31104201000 | C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 1 use, includes shoring, erecting, bracing, stripping and cleaning | $250,836.35 |
| 1.000 | 31104206500 | C.I.P. concrete forms, elevated slab, curb forms, wood, 6" to 12" high, 1 use, includes shoring, erecting, bracing, stripping and cleaning | $4,578.40 |
| 1.000 | 31104207000 | C.I.P. concrete forms, elevated slab, edge forms, to 6" high, 4 use, includes shoring, erecting, bracing, stripping and cleaning | $1,750.00 |
| 1.000 | 31104559260 | C.I.P. concrete forms, walls, steel framed plywood, over 8' to 16' high, based on 100 uses of purchased forms, 4 uses of bracing lumber, includes erecting, bracing, stripping and cleaning | $66,704.20 |
| 1.000 | 31500800020 | Anchor bolts, J-type, 1/2" diameter x 6" long, includes nut and washer | $1,338.60 |
| 1.000 | 31501701000 | Column clamp, adjustable, buy, to 24" x 24" | $85.00 |
| 1.000 | 31506001500 | Shores, reshoring | $20,912.40 |
| **Division 3 Concrete - Reinforcement** | | | |
| 1.000 | 32101001200 | High chairs, for reinforcing steel, individual, no plates, plain, to 3" high, includes material only | $19,821.00 |
| 1.000 | 32101001500 | Bar chair, for reinforcing steel, plain, includes material only | $14,852.26 |
| 1.000 | 32106000200 | Reinforcing steel, in place, columns, #3 to #7, A615, grade 60, incl access. Labor | $8,465.76 |
| 1.000 | 32106000400 | Reinforcing steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl access. Labor | $67,314.35 |
| 1.000 | 32106000500 | Reinforcing steel, in place, footings, #4 to #7, A615, grade 60, incl access. Labor | $40,692.09 |
| 1.000 | 32106000700 | Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl access. Labor | $16,049.42 |
| 1.000 | 32202000200 | Welded wire fabric, sheets, 6 x 6 - W2.1 x W2.1 (8 x 8) 30 lb. per C.S.F., A185 | $12,748.80 |
| 1.000 | 32202000300 | Welded wire fabric, sheets, 6 x 6 - W2.9 x W2.9 (6 x 6) 42 lb. per C.S.F., A185 | $58,268.00 |
| **Division 3 Concrete - Cast-In-Place** | | | |
| 1.000 | 33102200150 | Structural concrete, ready mix, normal weight, 3000 psi, includes material only | $132,168.96 |
| 1.000 | 33102200411 | Structural concrete, ready mix, normal weight, 6000 PSI, includes material only | $207,304.69 |
| 0.000 | 33102201000 | Structural concrete, ready mix, high early strength cement, add, includes material only | |
| 1.000 | 33107000800 | Structural concrete, placing, column, square or round, pumped, 24" thick, includes vibrating, excludes material | $1,820.03 |
| 1.000 | 33107001400 | Structural concrete, placing, elevated slab, pumped, less than 6" thick, includes vibrating, excludes material | $18,764.50 |
| 1.000 | 33107001600 | Structural concrete, placing, elevated slab, pumped, over 10" thick, includes vibrating, excludes material | $14,104.62 |
| 1.000 | 33107002650 | Structural concrete, placing, spread footing, pumped, over 5 C.Y., includes vibrating, excludes material | $8,204.02 |
| 1.000 | 33107003250 | Structural concrete, placing, grade beam, pumped, includes vibrating, excludes material | $1,043.47 |
| 1.000 | 33107004350 | Structural concrete, placing, slab on grade, pumped, 4" thick, includes vibrating, excludes material | $8,267.89 |
| 1.000 | 33107005100 | Structural concrete, placing, walls, pumped, 12" thick, includes vibrating, excludes material | $8,208.07 |
| 1.000 | 33503000250 | Concrete finishing, floors, monolithic, machine trowel finish | $61,705.35 |
| 1.000 | 33503250120 | Control joint, concrete floor slab, saw cut in green concrete, 1" depth | $794.04 |
| **Division 5 Metals - Cold Formed Framing** | | | |
| 1.000 | 54104006400 | Partition, galv LB studs, 16 ga x 6" W studs 16" O.C. x 12' H, incl galv top & bottom track, excl openings, headers, beams, bracing & bridging | $403,447.20 |
| 1.000 | 54204100550 | Floor joist, galv CF steel, 12 ga x 12" D, incl joists (2" flange) & fasteners, excl band joists (track), web stiffeners, headers, beams, bridging & bracing, materials only | $153,159.24 |
| 1.000 | 54204101550 | Floor joist, galv CF steel, 12 ga x 12" D, incl fastening to band joists, beams & headers, excl materials, labor only | $46,305.00 |

**Total:** **$1,664,664.75**

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$1,729,586.68**

*Detailed Structural Estimate for Wellington Condominiums*

## Wall Strip Footings — Foundations

| Qty | CSI Number | Description | Crew | Daily Output | Labor Hours | Unit | Bare Mat. | Bare Labor | Bare Equip. | Total | Total Incl. O&P | Zip Code Prefix | Type | Release |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Division 3 Concrete** | | | | | | | | | | | | | | |
| 7.610 | 32101001200 | High chairs, for reinforcing steel | | | | C | 506.07 | 0.00 | 0.00 | 506.07 | 555.53 | 181 | Open | 2005 |
| 7.610 | 32101001500 | Bar chair, for reinforcing steel | | | | C | 285.38 | 0.00 | 0.00 | 285.38 | 312.01 | 181 | Open | 2005 |
| 2.445 | 32106000500 | Reinforcing steel, in place, footings, #4 to #7 | 4 Rodm | 2.1 | 15.238 | Ton | 1,919.33 | 1,088.03 | 0.00 | 3,007.35 | 4,034.25 | 181 | Open | 2005 |
| 84.56 | 33102200411 | Structural concrete, ready mix, normal weight | | | | C.Y. | 7,737.24 | 0.00 | 0.00 | 7,737.24 | 8,510.96 | 181 | Open | 2005 |
| 84.56 | 33107003250 | Structural concrete, placing, grade beam | C20 | 180 | 0.356 | C.Y. | 0.00 | 634.20 | 409.27 | 1,043.47 | 1,509.40 | 181 | Open | 2005 |
| | | **Totals** | | | | | **$10,448.01** | **$1,722.23** | **$409.27** | **$12,579.50** | **$14,922.15** | | | |

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$13,070.10**

## Single Slab Column Footings — Foundations

| Qty | CSI Number | Description | Crew | Daily Output | Labor Hours | Unit | Bare Mat. | Bare Labor | Bare Equip. | Total | Total Incl. O&P | Zip Code Prefix | Type | Release |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Division 3 Concrete** | | | | | | | | | | | | | | |
| 98.000 | 32101001500 | Bar chair, for reinforcing steel | | | | C | 3,675.00 | 0.00 | 0.00 | 3,675.00 | 4,018.00 | 181 | Open | 2005 |
| 30.638 | 32106000500 | Reinforcing steel, in place, footings, #4 to #7 | 4 Rodm | 2.1 | 15.238 | Ton | 24,050.83 | 13,633.91 | 0.00 | 37,684.74 | 50,552.70 | 181 | Open | 2005 |
| 556.205 | 33102200411 | Structural concrete, ready mix, normal weight | | | | C.Y. | 50,892.76 | 0.00 | 0.00 | 50,892.76 | 55,982.03 | 181 | Open | 2005 |
| 556.205 | 33107002650 | Structural concrete, placing, spread footing | C20 | 150 | 0.427 | C.Y. | 0.00 | 4,978.03 | 3,225.99 | 8,204.02 | 11,958.41 | 181 | Open | 2005 |
| | | **Totals** | | | | | **$78,618.59** | **$18,611.94** | **$3,225.99** | **$100,456.52** | **$122,511.14** | | | |

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$104,374.32**

## Foundation Walls — Substructure

| Qty | CSI Number | Description | Crew | Daily Output | Labor Hours | Unit | Bare Mat. | Bare Labor | Bare Equip. | Total | Total Incl. O&P | Zip Code Prefix | Type | Release |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Division 3 Concrete** | | | | | | | | | | | | | | |
| 21,942.170 | 31104559260 | C.I.P. concrete forms, walls | C2 | 450 | 0.107 | SFCA | 8,338.02 | 58,366.17 | 0.00 | 66,704.20 | 108,174.90 | 181 | Open | 2005 |
| 14.657 | 32106000700 | Reinforcing steel, in place, walls, #3 to #7 | 4 Rodm | 3 | 10.667 | Ton | 11,505.75 | 4,543.67 | 0.00 | 16,049.42 | 20,886.23 | 181 | Open | 2005 |
| 406.340 | 33102200411 | Structural concrete, ready mix, normal weight | | | | C.Y. | 37,180.11 | 0.00 | 0.00 | 37,180.11 | 40,898.12 | 181 | Open | 2005 |
| 406.340 | 33107005100 | Structural concrete, placing, walls, pumped | C20 | 110 | 0.582 | C.Y. | 0.00 | 4,977.67 | 3,230.40 | 8,208.07 | 11,783.86 | 181 | Open | 2005 |
| | | **Totals** | | | | | **$57,023.88** | **$67,887.51** | **$3,230.40** | **$128,141.79** | **$181,743.10** | | | |

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$133,139.32**

*Detailed Structural Estimate for Wellington Condominiums*

## Foundation Columns — Substructure

| Qty | CSI Number | Description | Crew | Daily Output | Labor Hours | Unit | Bare Mat. | Bare Labor | Bare Equip. | Total | Total Incl. O&P | Zip Code Prefix | Type | Release |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Division 3 Concrete** | | | | | | | | | | | | | | |
| 4,516.930 | 31104107750 | C.I.P. concrete forms, column, square | C1 | 440 | 0.073 | SFCA | 6,865.73 | 8,085.30 | 0.00 | 14,951.04 | 21,274.74 | 181 | Open | 2005 |
| 1.000 | 31501701000 | Column clamp, adjustable, buy, to 24" x 24" | | | | Set | 85.00 | 0.00 | 0.00 | 85.00 | 93.50 | 181 | Open | 2005 |
| 5.879 | 32106000200 | Reinforcing steel, in place, columns, #3 to #7 | 4 Rodm | 1.5 | 21.333 | Ton | 4,850.18 | 3,615.59 | 0.00 | 8,465.76 | 11,758.00 | 181 | Open | 2005 |
| 75.520 | 33102200411 | Structural concrete, ready mix, normal weight | | | | C.Y. | 6,910.08 | 0.00 | 0.00 | 6,910.08 | 7,601.09 | 181 | Open | 2005 |
| 75.520 | 33107000800 | Structural concrete, placing, column, square | C20 | 92 | 0.696 | C.Y. | 0.00 | 1,106.37 | 713.66 | 1,820.03 | 2,643.20 | 181 | Open | 2005 |
| | | **Totals** | | | | | **$18,710.99** | **$12,807.26** | **$713.66** | **$32,231.91** | **$43,370.53** | | | |

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$33,488.95**

## Slab on Grade — Substructure

| Qty | CSI Number | Description | Crew | Daily Output | Labor Hours | Unit | Bare Mat. | Bare Labor | Bare Equip. | Total | Total Incl. O&P | Zip Code Prefix | Type | Release |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Division 3 Concrete** | | | | | | | | | | | | | | |
| 307.200 | 32202000200 | Welded wire fabric, sheets, 6 x 6 - W2.1 x W2.1 | 2 Rodm | 31 | 0.516 | C.S.F. | 8,140.80 | 4,608.00 | 0.00 | 12,748.80 | 17,203.20 | 181 | Open | 2005 |
| 484.920 | 33102200150 | Structural concrete, ready mix, normal weight | | | | C.Y. | 38,405.66 | 0.00 | 0.00 | 38,405.66 | 42,246.23 | 181 | Open | 2005 |
| 484.920 | 33107004350 | Structural concrete, placing, slab on grade | C20 | 130 | 0.492 | C.Y. | 0.00 | 5,018.92 | 3,248.96 | 8,267.89 | 11,880.54 | 181 | Open | 2005 |
| 30,720.000 | 33503000250 | Concrete finishing, floors, monolithic | 1 Cefi | 550 | 0.015 | S.F. | 0.00 | 10,752.00 | 0.00 | 10,752.00 | 17,510.40 | 181 | Open | 2005 |
| 509.000 | 33503250120 | Control joint, concrete floor slab | C27 | 2,000 | 0.008 | L.F. | 0.00 | 96.71 | 35.63 | 132.34 | 193.42 | 181 | Open | 2005 |
| | | **Totals** | | | | | **$46,546.46** | **$20,475.63** | **$3,284.59** | **$70,306.69** | **$89,033.79** | | | |

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$73,048.65**

## Transfer Slab — Superstructure

| Qty | CSI Number | Description | Crew | Daily Output | Labor Hours | Unit | Bare Mat. | Bare Labor | Bare Equip. | Total | Total Incl. O&P | Zip Code Prefix | Type | Release |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Division 3 Concrete** | | | | | | | | | | | | | | |
| 29,045.000 | 31104201000 | C.I.P. concrete forms, elevated slab, flat plate | C2 | 470 | 0.102 | S.F. | 118,503.60 | 74,064.75 | 0.00 | 192,568.35 | 255,596.00 | 181 | Open | 2005 |
| 776.000 | 31104206500 | C.I.P. concrete forms, elevated slab, curb forms | C1 | 180 | 0.178 | SFCA | 1,171.76 | 3,406.64 | 0.00 | 4,578.40 | 7,022.80 | 181 | Open | 2005 |
| 388.000 | 31500800020 | Anchor bolts, J-type, 1/2" diameter x 6" long | 1 Carp | 90 | 0.089 | Ea. | 372.48 | 966.12 | 0.00 | 1,338.60 | 2,056.40 | 181 | Open | 2005 |
| 29,045.000 | 31506001500 | Shores, reshoring | 2 Carp | 1,400 | 0.011 | S.F. | 11,327.55 | 9,584.85 | 0.00 | 20,912.40 | 28,173.65 | 181 | Open | 2005 |
| 290.450 | 32101001200 | High chairs, for reinforcing steel | | | | C | 19,314.93 | 0.00 | 0.00 | 19,314.93 | 21,202.85 | 181 | Open | 2005 |
| 290.450 | 32101001500 | Bar chair, for reinforcing steel, plain | | | | C | 10,891.88 | 0.00 | 0.00 | 10,891.88 | 11,908.45 | 181 | Open | 2005 |
| 56.330 | 32106000400 | Reinforcing steel, in place, elevated slabs | 4 Rodm | 2.9 | 11.034 | Ton | 49,288.75 | 18,025.60 | 0.00 | 67,314.35 | 85,903.25 | 181 | Open | 2005 |
| 1,143.000 | 33102200411 | Structural concrete, ready mix, normal weigh | | | | C.Y. | 104,584.50 | 0.00 | 0.00 | 104,584.50 | 115,042.95 | 181 | Open | 2005 |
| 1,143.000 | 33107001600 | Structural concrete, placing, elevated slab | C20 | 180 | 0.356 | C.Y. | 0.00 | 8,572.50 | 5,532.12 | 14,104.62 | 20,402.55 | 181 | Open | 2005 |
| 29,045.000 | 33503000250 | Concrete finishing, floors, monolithic | 1 Cefi | 550 | 0.015 | S.F. | 0.00 | 10,165.75 | 0.00 | 10,165.75 | 16,555.65 | 181 | Open | 2005 |
| 509.000 | 33503250120 | Control joint, concrete floor slab | C27 | 2,000 | 0.008 | L.F. | 0.00 | 96.71 | 35.63 | 132.34 | 193.42 | 181 | Open | 2005 |
| | | **Totals** | | | | | **$315,455.44** | **$124,882.92** | **$5,567.75** | **$445,906.11** | **$564,057.97** | | | |

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$463,296.45**

## Metal Stud Framing — Superstructure

| Qty | CSI Number | Description | Crew | Daily Output | Labor Hours | Unit | Bare Mat. | Bare Labor | Bare Equip. | Total | Total Incl. O&P | Zip Code Prefix | Type | Release |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Division 5 Metals** | | | | | | | | | | | | | | |
| 13,936.000 | 54104006400 | Partition, galv LB studs, 16 ga x 6" W studs | 2 Carp | 51 | 0.314 | L.F. | 262,693.60 | 140,753.60 | 0.00 | 403,447.20 | 529,568.00 | 181 | Open | 2005 |
| | | **Totals** | | | | | **$262,693.60** | **$140,753.60** | **$0.00** | **$403,447.20** | **$529,568.00** | | | |

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$419,181.64**

## Hambro Joist System and Components — Superstructure

| Qty | CSI Number | Description | Crew | Daily Output | Labor Hours | Unit | Bare Mat. | Bare Labor | Bare Equip. | Total | Total Incl. O&P | Zip Code Prefix | Type | Release |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Division 5 Metals** | | | | | | | | | | | | | | |
| 25526.54 | 54204100550 | Floor joist, galv CF steel, 12 ga x 12" D | | | | L.F. | 153,159.24 | 0.00 | 0.00 | 153,159.24 | 167,198.84 | 181 | Open | 2005 |
| 2,700.000 | 54204101550 | Floor joist, galv CF steel, 12 ga x 12" D | 2 Carp | 30 | 0.533 | Ea. | 0.00 | 46,305.00 | 0.00 | 46,305.00 | 78,300.00 | 181 | Open | 2005 |
| | | **Totals** | | | | | **$153,159.24** | **$46,305.00** | **$0.00** | **$199,464.24** | **$245,498.84** | | | |

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$207,243.35**

## Deck Slabs — Superstructure

| Qty | CSI Number | Description | Crew | Daily Output | Labor Hours | Unit | Bare Mat. | Bare Labor | Bare Equip. | Total | Total Incl. O&P | Zip Code Prefix | Type | Release |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Division 3 Concrete** | | | | | | | | | | | | | | |
| 29,134.000 | 31104201000 | C.I.P. concrete forms, elevated slab, flat plate | C2 | 470 | 0.102 | S.F. | 14,567.00 | 14,567.00 | 0.00 | 58,268.00 | 98,181.58 | 181 | Open | 2005 |
| 1,000.000 | 31104207000 | C.I.P. concrete forms, elevated slab, edge forms | C1 | 500 | 0.064 | L.F. | 170.00 | 1,580.00 | 0.00 | 1,750.00 | 2,860.00 | 181 | Open | 2005 |
| 1,165.360 | 32202000300 | Welded wire fabric, sheets, 6 x 6 - W2.9 x W2.9 | 2 Rodm | 29 | 0.552 | C.S.F. | 39,622.24 | 18,645.76 | 0.00 | 58,268.00 | 76,331.08 | 181 | Open | 2005 |
| 1,183.880 | 33102200150 | Structural concrete, ready mix, normal weight | | | | C.Y. | 93,763.30 | 0.00 | 0.00 | 93,763.30 | 103,139.63 | 181 | Open | 2005 |
| 1,183.880 | 33102201000 | Structural concrete, ready mix | | | | C.Y. | 10.00% | | | | | 181 | Open | 2005 |
| 1,183.880 | 33107001400 | Structural concrete, placing, elevated slab | C20 | 140 | 0.457 | C.Y. | 0.00 | 11,424.44 | 7,340.06 | 18,764.50 | 27,229.24 | 181 | Open | 2005 |
| 116,536.000 | 33503000250 | Concrete finishing, floors, monolithic | 1 Cefi | 550 | 0.015 | S.F. | 0.00 | 40,787.60 | 0.00 | 40,787.60 | 66,425.52 | 181 | Open | 2005 |
| 2,036.000 | 33503250120 | Control joint, concrete floor slab | C27 | 2,000 | 0.008 | L.F. | 0.00 | 386.84 | 142.52 | 529.36 | 773.68 | 181 | Open | 2005 |
| | | **Totals** | | | | | **$148,122.64** | **$87,391.64** | **$7,482.58** | **$272,130.75** | **$374,940.73** | | | |

**ENR Building Cost Index Inflation from 2005 to 2006** (Addition of 3.9% Total Cost Escalation)

**Allentown, PA Location Factor already in calculations**

**$282,743.85**



## E.3 Brief Analysis

### E.3.1 Assumptions

A list of the following assumptions has been made for the attached structural estimate and is as followed:

- Concrete is 6000 PSI strength not 5000 PSI strength
- No vapor barriers/insulation/waterproofing/non load bearing walls
- No stairways or elevators
- Foundation wall forms include temporary shoring
- No expansion joints, inserts, sleeves, chases, splicing
- No metal roof framing – design and built by specialty company
- Accessories/tools found in general conditions
- No Waste was included in calculations
- Balcony reinforcing similar to other parts of composite deck
- Not including steel W members assume part of metal stud framing
- The second, third, and forth floor the same
- No detail connections required for joist members
- Footings on the same grade and reinforcing

### E.3.2 Comparison of Detailed Estimate v. Actual Project Estimate

The total amount for the detailed and actual estimates are listed as followed:

- Detailed Estimate: $1,966,198.55 = $13.37 / SF
- Actual Project Estimate: $2,530,307.00 = $17.20 / SF
- Estimate Difference: $564,108.45 = 3.12%

The results are different due to the fact the detailed estimate performed did not take into consideration waste or the need of such things like detailed connections or splices. The detailed estimate is a near perfect representation of everything performing up to expectations without delays or problems. Just the structural miscellaneous metals on the project were alone budgeted for $200,000.00. To compare more accurately the estimates, if add a factor of 20% for waste, detailed connections, and miscellaneous metals the totals are as followed:

- Detailed Estimate: $2,359,438.26 = $16.04 / SF
- Actual Project Estimate: $2,530,307.00 = $17.20 / SF
- Estimate Difference: $170,868.74 = 0.94%



# F. General Conditions Estimate

## F.1 Introduction

An estimate for the general conditions was assembled for the Wellington Condominiums project. Part of the estimate includes the following costs: management team, inspections, permits, temporary signs, temporary utilities, construction trailers, tools, and punch list. What is not included in the general conditions are consultants and geotechnical services. These costs are paid for by the owner of the project and not on the general conditions.

## F.2 General Conditions Estimate

***General Conditions Estimate for Wellington Condominiums***

**General Conditions**

| Description | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| SR. PROJECT MANAGER | 35 | WKS | $3,500.00 | $122,500 |
| SUPERINTENDENT | 60 | WKS | $3,000.00 | $180,000 |
| LABORER | 52 | WKS | $800.00 | $41,600 |
| ASSISTANT SUPERINTENDENT | 30 | WKS | $2,500.00 | $75,000 |
| SURVEYING | 1 | L.S | $22,000.00 | $22,000 |
| INSPECTIONS | 1 | L.S | $30,000.00 | $30,000 |
| TWP BLDG PERMIT | 1 | L.S | $44,405.00 | $44,405 |
| FITOUT PERMIT | 48 | EACH | $400.00 | $19,200 |
| TEMPORARY UTILITIES | 1 | L.S | $30,000.00 | $30,000 |
| TEMPORARY SIGNS | 1 | EACH | $2,500.00 | $2,500 |
| CONSTRUCTION TRAILERS | 14 | MTH | $300.00 | $4,200 |
| OFFICE EXPENSES (BLUE PRINTS) | 116,000 | S.F. | $0.22 | $25,520 |
| TRASH REMOVAL (DUMPSTERS) | 60 | EACH | $500.00 | $30,000 |
| EQUIP & TOOL RENTALS | 1 | L.S | $20,000.00 | $20,000 |
| MATERIALS & SUPPLIES | 12 | MTH | $200.00 | $2,400 |
| FINAL SITE CLEAN-UP | 1 | EACH | $5,000.00 | $5,000 |
| FINAL BUILDING CLEAN-UP | 48 | EACH | $400.00 | $19,200 |
| PUNCH LIST | 48 | EACH | $400.00 | $19,200 |
| | | | **Total:** | **$692,725.00** |



## F.3 Brief Analysis

### E.3.2 Comparison of General Conditions Estimate v. Industry Standards

The total general condition cost for the Wellington Condominium project is $692,725.00. The percentage of the total construction dedicated to the general conditions is 3.83%. The project staff in technical assignment #1 was used to calculate the general conditions. The 3.83% of total construction cost that the general conditions accumulate are reasonable in today's construction industry.



## A. Appendix A – Backup Estimate Calculations

*See the Following Attached Pages*

## Wellington Condominiums Takeoffs

| Single Slab Column Footings | | | | | Takeoffs | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Dimensions | | | | | | | | | | |
| Length (in.) | x | Width (in.) | x | Depth (in.) | Volume (in^3) | Concrete (CY) | Rebar (LFT) | Formwork (SFCA) | Rebar (lbs.) | Rebar (Tons) |
| 198 | | 198 | | 18 | 705672 | 15.125 | 1633.5 | 0 | 1703.741 | 0.85187 |
| 204 | | 204 | | 18 | 749088 | 16.05556 | 1734 | 0 | 1808.562 | 0.904281 |
| 195 | | 195 | | 18 | 684450 | 14.67014 | 1584.375 | 0 | 1652.503 | 0.826252 |
| 186 | | 186 | | 18 | 622728 | 13.34722 | 1441.5 | 0 | 1503.485 | 0.751742 |
| 201 | | 201 | | 18 | 727218 | 15.58681 | 1683.375 | 0 | 1755.76 | 0.87788 |
| 195 | | 195 | | 18 | 684450 | 14.67014 | 1584.375 | 0 | 1652.503 | 0.826252 |
| 204 | | 204 | | 18 | 749088 | 16.05556 | 1734 | 0 | 1808.562 | 0.904281 |
| 198 | | 198 | | 18 | 705672 | 15.125 | 1633.5 | 0 | 1703.741 | 0.85187 |
| 147 | | 147 | | 18 | 388962 | 8.336806 | 900.375 | 0 | 939.0911 | 0.469546 |
| 216 | | 216 | | 18 | 839808 | 18 | 1944 | 0 | 2027.592 | 1.013796 |
| 234 | | 234 | | 18 | 985608 | 21.125 | 2281.5 | 0 | 2379.605 | 1.189802 |
| 183 | | 183 | | 15 | 502335 | 10.76678 | 1395.375 | 0 | 1455.376 | 0.727688 |
| 198 | | 198 | | 18 | 705672 | 15.125 | 1633.5 | 0 | 1703.741 | 0.85187 |
| 183 | | 183 | | 15 | 502335 | 10.76678 | 1395.375 | 0 | 1455.376 | 0.727688 |
| 234 | | 234 | | 18 | 985608 | 21.125 | 2281.5 | 0 | 2379.605 | 1.189802 |
| 216 | | 216 | | 18 | 839808 | 18 | 1944 | 0 | 2027.592 | 1.013796 |
| 147 | | 147 | | 18 | 388962 | 8.336806 | 900.375 | 0 | 939.0911 | 0.469546 |
| 222 | | 222 | | 24 | 1182816 | 25.35185 | 2053.5 | 0 | 2141.801 | 1.0709 |
| 204 | | 204 | | 18 | 749088 | 16.05556 | 1734 | 0 | 1808.562 | 0.904281 |
| 234 | | 234 | | 18 | 985608 | 21.125 | 2281.5 | 0 | 2379.605 | 1.189802 |
| 159 | | 159 | | 21 | 530901 | 11.37905 | 1053.375 | 0 | 1098.67 | 0.549335 |
| 234 | | 234 | | 18 | 985608 | 21.125 | 2281.5 | 0 | 2379.605 | 1.189802 |
| 204 | | 204 | | 18 | 749088 | 16.05556 | 1734 | 0 | 1808.562 | 0.904281 |
| 186 | | 186 | | 24 | 830304 | 17.7963 | 1441.5 | 0 | 1503.485 | 0.751742 |
| 222 | | 222 | | 21 | 1034964 | 22.18287 | 2053.5 | 0 | 2141.801 | 1.0709 |
| 222 | | 222 | | 18 | 887112 | 19.01389 | 2053.5 | 0 | 2141.801 | 1.0709 |
| 222 | | 222 | | 18 | 887112 | 19.01389 | 2053.5 | 0 | 2141.801 | 1.0709 |
| 189 | | 189 | | 18 | 642978 | 13.78125 | 1488.375 | 0 | 1552.375 | 0.776188 |
| 213 | | 213 | | 18 | 816642 | 17.50347 | 1890.375 | 0 | 1971.661 | 0.985831 |
| 186 | | 186 | | 15 | 518940 | 11.12269 | 1441.5 | 0 | 1503.485 | 0.751742 |
| 213 | | 213 | | 18 | 816642 | 17.50347 | 1890.375 | 0 | 1971.661 | 0.985831 |
| 189 | | 189 | | 18 | 642978 | 13.78125 | 1488.375 | 0 | 1552.375 | 0.776188 |
| 222 | | 222 | | 18 | 887112 | 19.01389 | 2053.5 | 0 | 2141.801 | 1.0709 |
| 222 | | 222 | | 21 | 1034964 | 22.18287 | 2053.5 | 0 | 2141.801 | 1.0709 |
| | | | | | **Totals:** | **556.21** | **58751** | | **61277** | **30.638** |

**Wellington Condominiums Takeoffs**

| Hambros Joists | | | Takeoffs | | |
|---|---|---|---|---|---|
| Joists | FT | IN | LFT | # OF JOISTS | TOTAL LFT |
| J9 | 27 | 2 | 27.16667 | 2 | 54.33333 |
| J10 | 27 | 2 | 27.16667 | 6 | 163 |
| J11 | 23 | | 23 | 2 | 46 |
| J12 | 19 | | 19 | 2 | 38 |
| J13 | 18 | | 18 | 2 | 36 |
| J14 | 19 | 4 | 19.33333 | 5 | 96.66667 |
| J15 | 15 | 3.5 | 15.29167 | 6 | 91.75 |
| J16 | 18 | 9 | 18.75 | 2 | 37.5 |
| J17 | 22 | 9 | 22.75 | 2 | 45.5 |
| J18 | 26 | 9 | 26.75 | 2 | 53.5 |
| J19 | 26 | 3.5 | 26.29167 | 11 | 289.2083 |
| J21 | 26 | 3.5 | 26.29167 | 4 | 105.1667 |
| J22 | 11 | 9.5 | 11.79167 | 2 | 23.58333 |
| J23 | 11 | 9.5 | 11.79167 | 6 | 70.75 |
| J24 | 11 | 9 | 11.75 | 12 | 141 |
| J25 | 11 | 9 | 11.75 | 2 | 23.5 |
| J26 | 17 | | 17 | 6 | 102 |
| J27 | 17 | 4.5 | 17.375 | 12 | 208.5 |
| J28 | 20 | 1.25 | 20.10417 | 4 | 80.41667 |
| J65 | 20 | 0.25 | 20.02083 | 2 | 40.04167 |
| J29 | 13 | 5.5 | 13.45833 | 2 | 26.91667 |
| J30 | 13 | 5.5 | 13.45833 | 18 | 242.25 |
| J31 | 11 | 5.5 | 11.45833 | 2 | 22.91667 |
| J23 | 11 | 5.5 | 11.45833 | 3 | 34.375 |
| J25 | 11 | 2.5 | 11.20833 | 5 | 56.04167 |
| J32 | 11 | 2.5 | 11.20833 | 4 | 44.83333 |
| J25 | 11 | 2.5 | 11.20833 | 2 | 22.41667 |
| J33 | 15 | 2 | 15.16667 | 6 | 91 |
| J34 | 15 | 10.625 | 15.88542 | 12 | 190.625 |
| J28 | 20 | 0.625 | 20.05208 | 2 | 40.10417 |
| J29 | 13 | 5.5 | 13.45833 | 2 | 26.91667 |
| J30 | 13 | 5.5 | 13.45833 | 14 | 188.4167 |
| J35 | 13 | 5.5 | 13.45833 | 4 | 53.83333 |
| J28 | 20 | 0.625 | 20.05208 | 2 | 40.10417 |
| J23 | 11 | 9.5 | 11.79167 | 3 | 35.375 |
| J25 | 11 | 4.5 | 11.375 | 5 | 56.875 |
| J25 | 11 | 2.625 | 11.21875 | 2 | 22.4375 |
| J7 | 12 | | 12 | 6 | 72 |
| J67 | 15 | 6 | 15.5 | 1 | 15.5 |
| J36 | 19 | 11 | 19.91667 | 2 | 39.83333 |
| J37 | 19 | 3.5 | 19.29167 | 8 | 154.3333 |
| J38 | 17 | 7.5 | 17.625 | 6 | 105.75 |
| J68 | 25 | 11.5 | 25.95833 | 1 | 25.95833 |
| J39 | 25 | 11.5 | 25.95833 | 5 | 129.7917 |
| J40 | 21 | 10.5 | 21.875 | 6 | 131.25 |
| J41 | 22 | 6 | 22.5 | 8 | 180 |
| J42 | 20 | 4 | 20.33333 | 2 | 40.66667 |
| J43 | 20 | 4 | 20.33333 | 6 | 122 |
| J44 | 7 | 2 | 7.166667 | 2 | 14.33333 |
| J45 | 10 | 5.5 | 10.45833 | 6 | 62.75 |
| J30 | 13 | 5.5 | 13.45833 | 23 | 309.5417 |
| J46 | 20 | 9.625 | 20.80208 | 1 | 20.80208 |
| J47 | 21 | 9 | 21.75 | 2 | 43.5 |
| J52 | 18 | 7.5 | 18.625 | 3 | 55.875 |
| J48 | 15 | 5.5 | 15.45833 | 3 | 46.375 |
| J49 | 15 | 5.5 | 15.45833 | 3 | 46.375 |
| J50 | 12 | 8 | 12.66667 | 24 | 304 |
| J45 | 10 | 8.625 | 10.71875 | 2 | 21.4375 |
| J2 | 6 | 3.25 | 6.270833 | 1 | 6.270833 |
| J53 | 9 | 8.75 | 9.729167 | 3 | 29.1875 |
| J54 | 5 | 9.25 | 5.770833 | 3 | 17.3125 |
| J55 | 12 | 11.625 | 12.96875 | 3 | 38.90625 |
| J56 | 9 | 0.625 | 9.052083 | 1 | 9.052083 |
| J24 | 11 | 8 | 11.66667 | 9 | 105 |
| J57 | 18 | 4 | 18.33333 | 2 | 36.66667 |
| J58 | 10 | | 10 | 12 | 120 |
| J56 | 9 | 0.625 | 9.052083 | 1 | 9.052083 |
| J24 | 11 | 8 | 11.66667 | 9 | 105 |
| J26 | 16 | 11.375 | 16.94792 | 1 | 16.94792 |
| J52 | 18 | 6 | 18.5 | 2 | 37 |
| J48 | 15 | 4 | 15.33333 | 4 | 61.33333 |
| J49 | 15 | 4 | 15.33333 | 3 | 46 |
| J45 | 10 | 5.5 | 10.45833 | 3 | 31.375 |
| J30 | 13 | 5.5 | 13.45833 | 8 | 107.6667 |
| J46 | 21 | 9 | 21.75 | 1 | 21.75 |
| J47 | 21 | 9 | 21.75 | 2 | 43.5 |
| J52 | 18 | 9.5 | 18.79167 | 3 | 56.375 |
| J48 | 15 | 5.5 | 15.45833 | 3 | 46.375 |
| J49 | 15 | 5.5 | 15.45833 | 3 | 46.375 |
| J44 | 7 | 2 | 7.166667 | 2 | 14.33333 |
| J45 | 10 | 3.5 | 10.29167 | 4 | 41.16667 |
| J67 | 19 | 11 | 19.91667 | 1 | 19.91667 |
| J1 | 9 | 5.625 | 9.46875 | 2 | 18.9375 |
| J2 | 6 | 1.625 | 6.135417 | 19 | 116.5729 |
| J3 | 7 | 8.625 | 7.71875 | 3 | 23.15625 |
| J4 | 8 | 1.625 | 8.135417 | 12 | 97.625 |
| J5 | 7 | 4 | 7.333333 | 3 | 22 |
| J6 | 9 | 0.625 | 9.052083 | 10 | 90.52083 |
| J8 | 15 | 7 | 15.58333 | 4 | 62.33333 |

**TOTAL LFT:** 6381.6

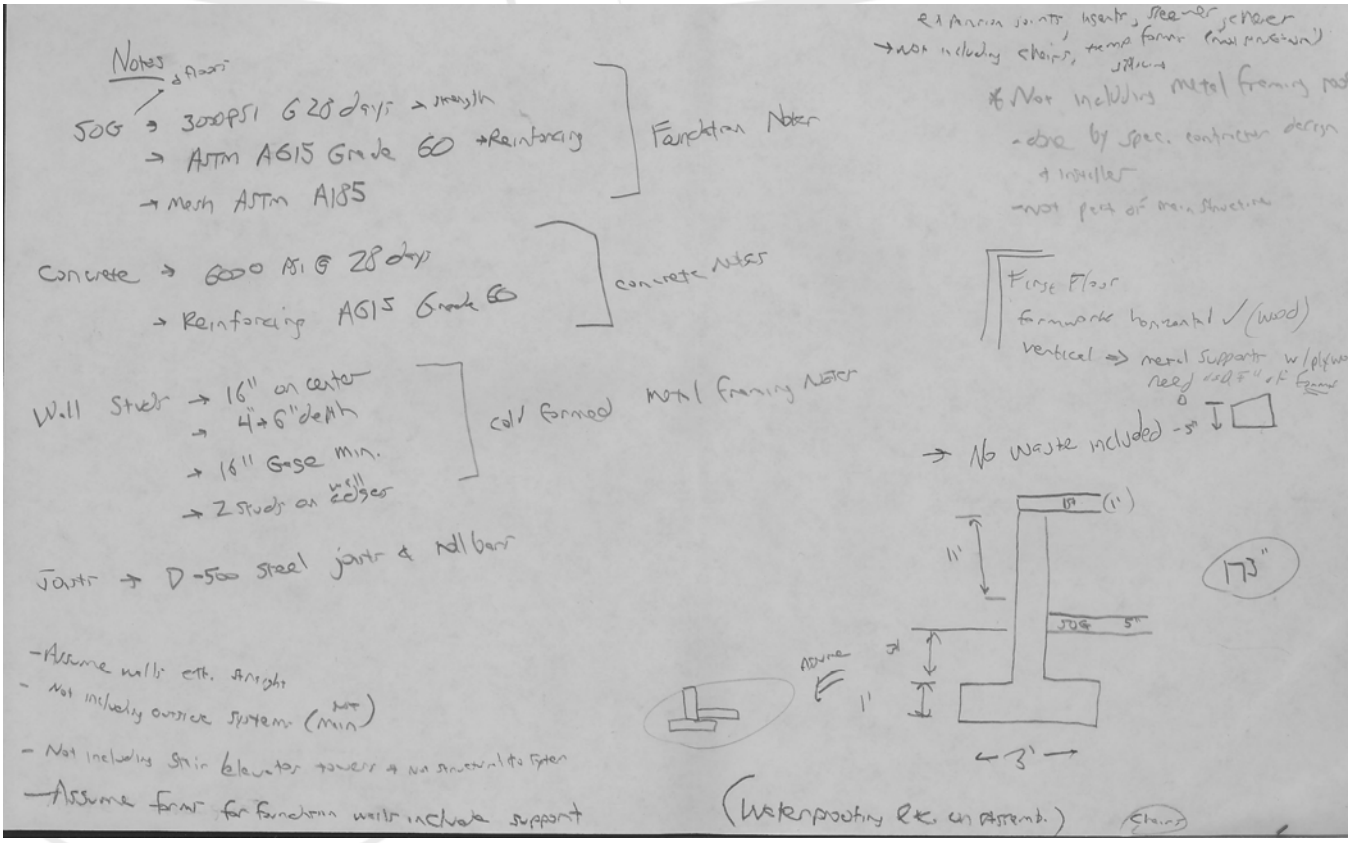
X

4 FLOORS

**25527 LFT**

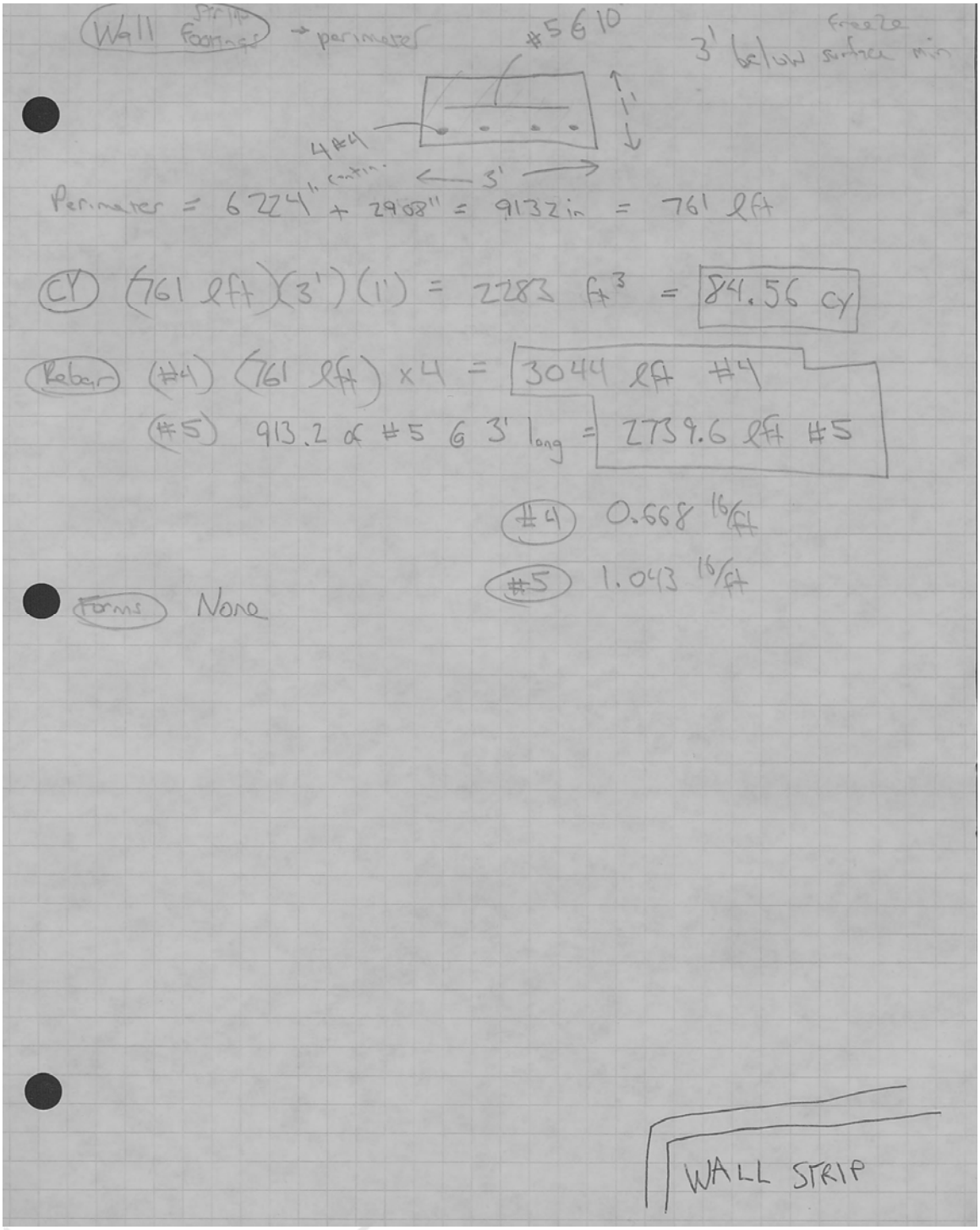


## Backup Estimate Calculations



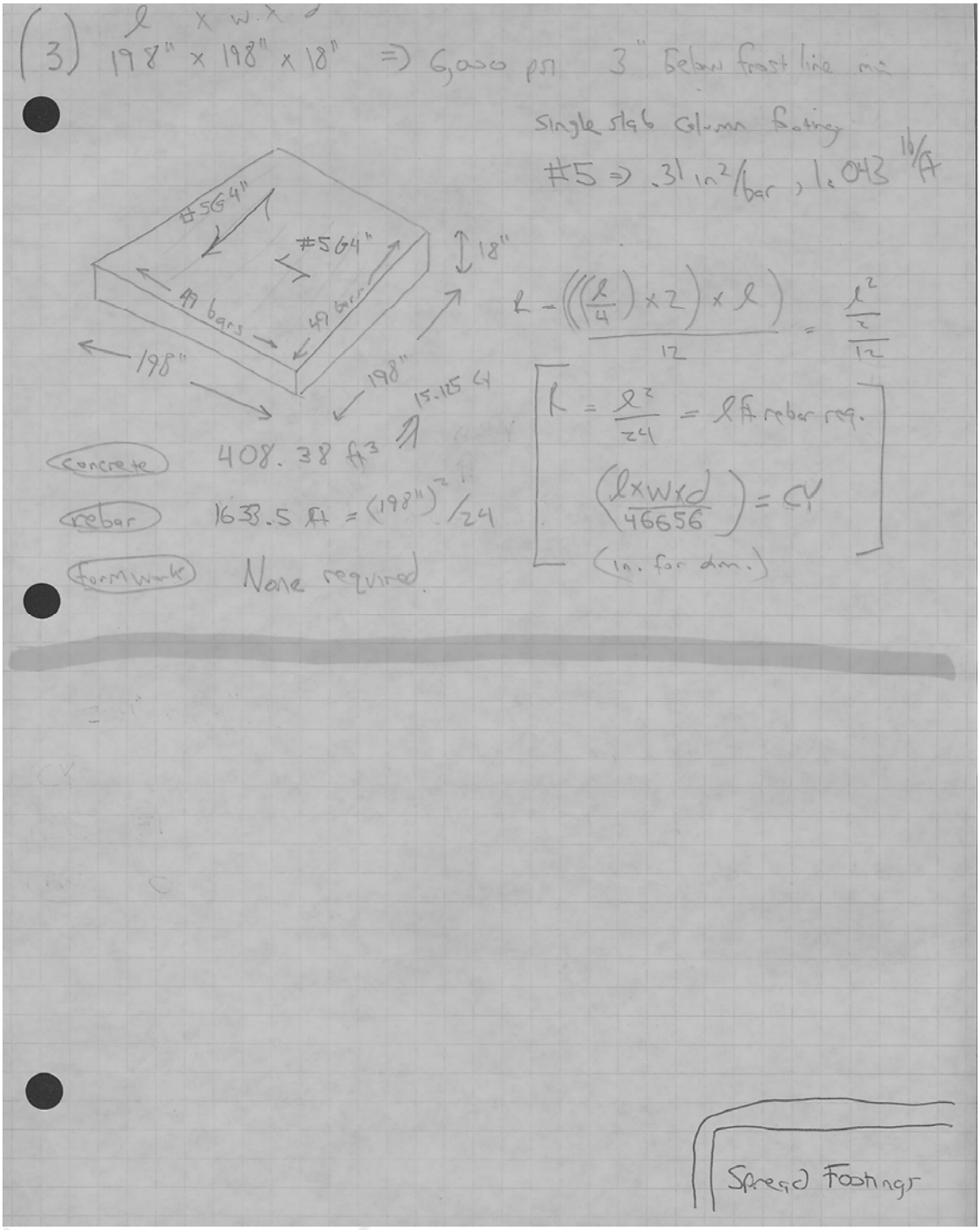

**General Notes**





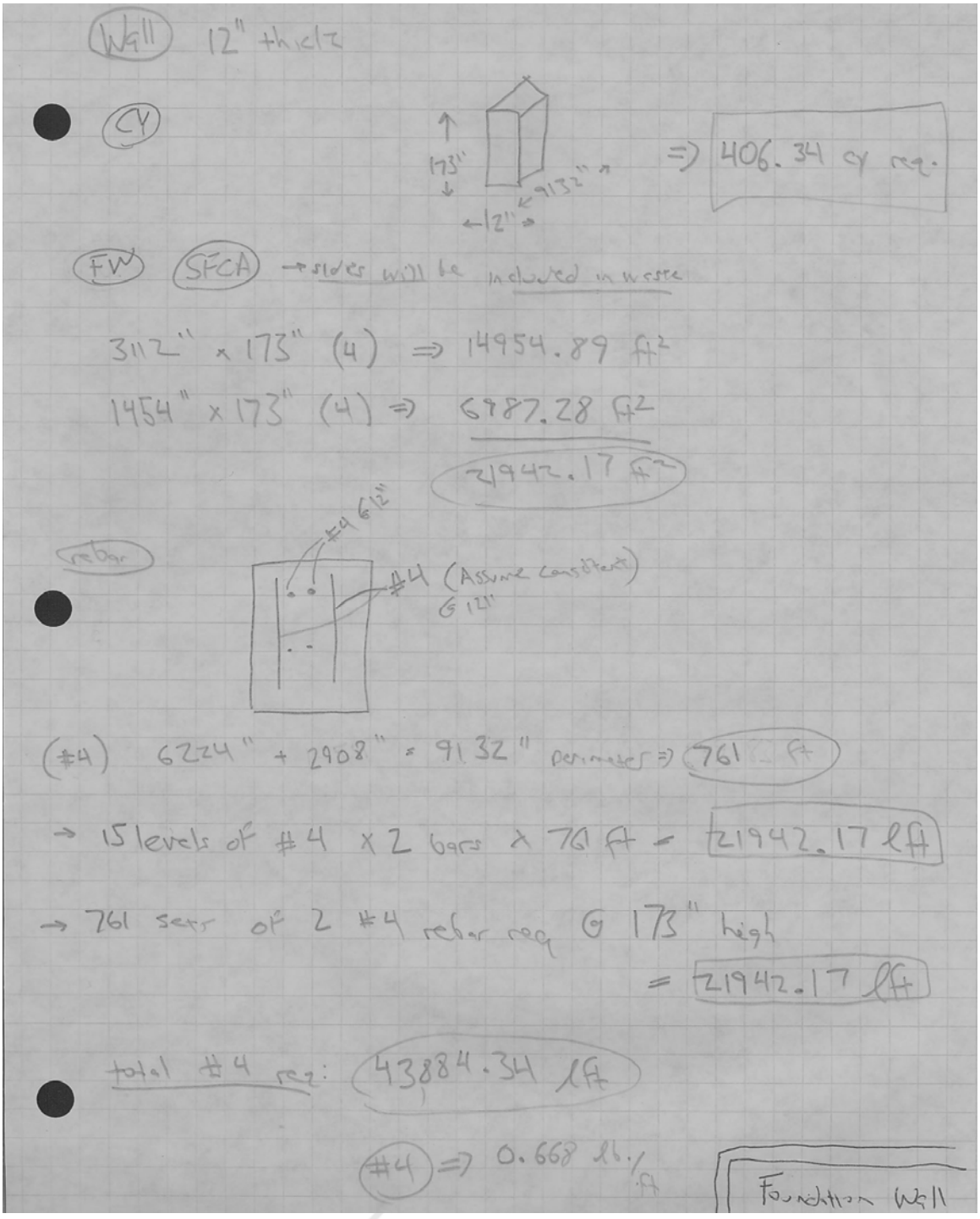

**Wall Strip Calculations**





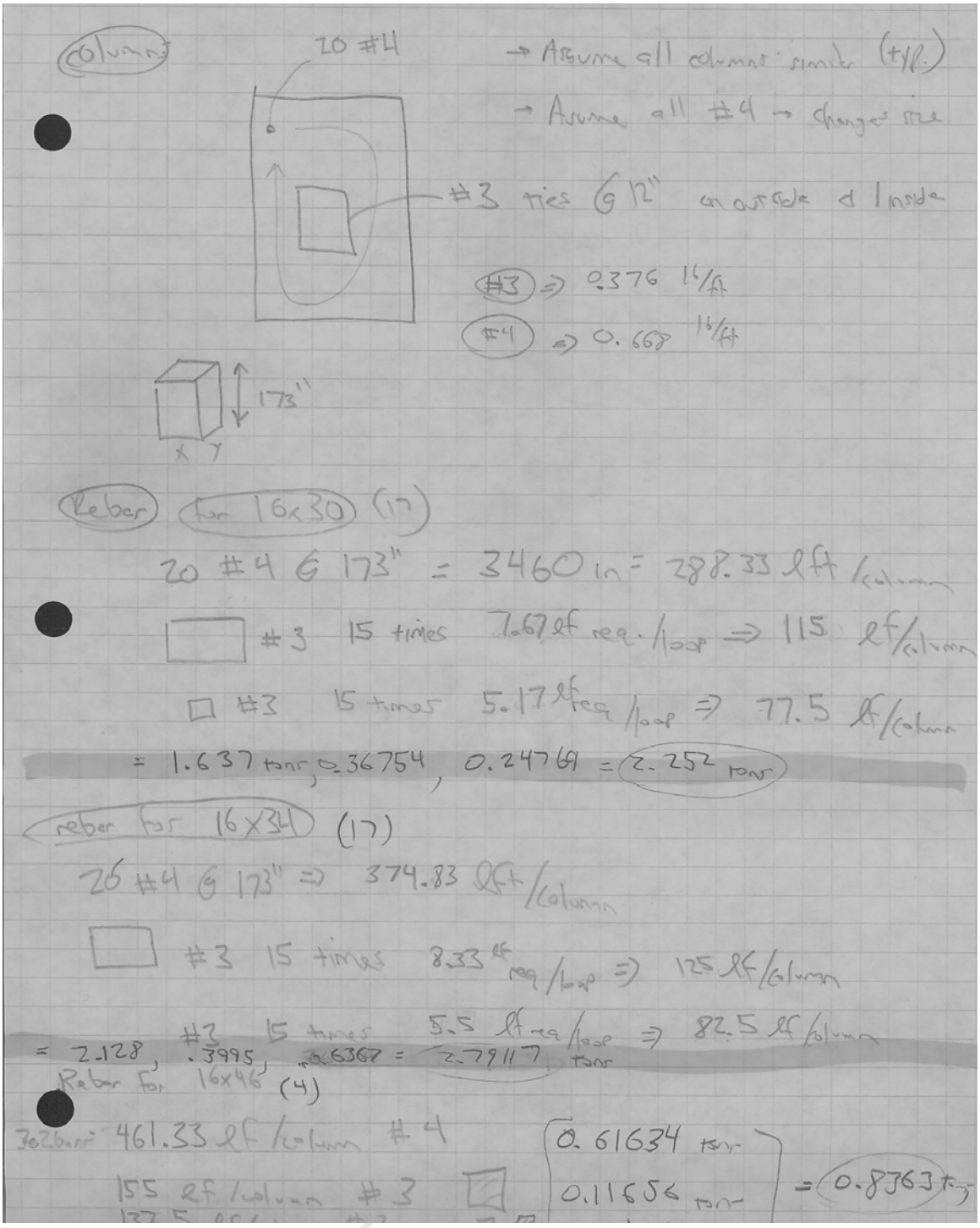

**Column Spread Footings**





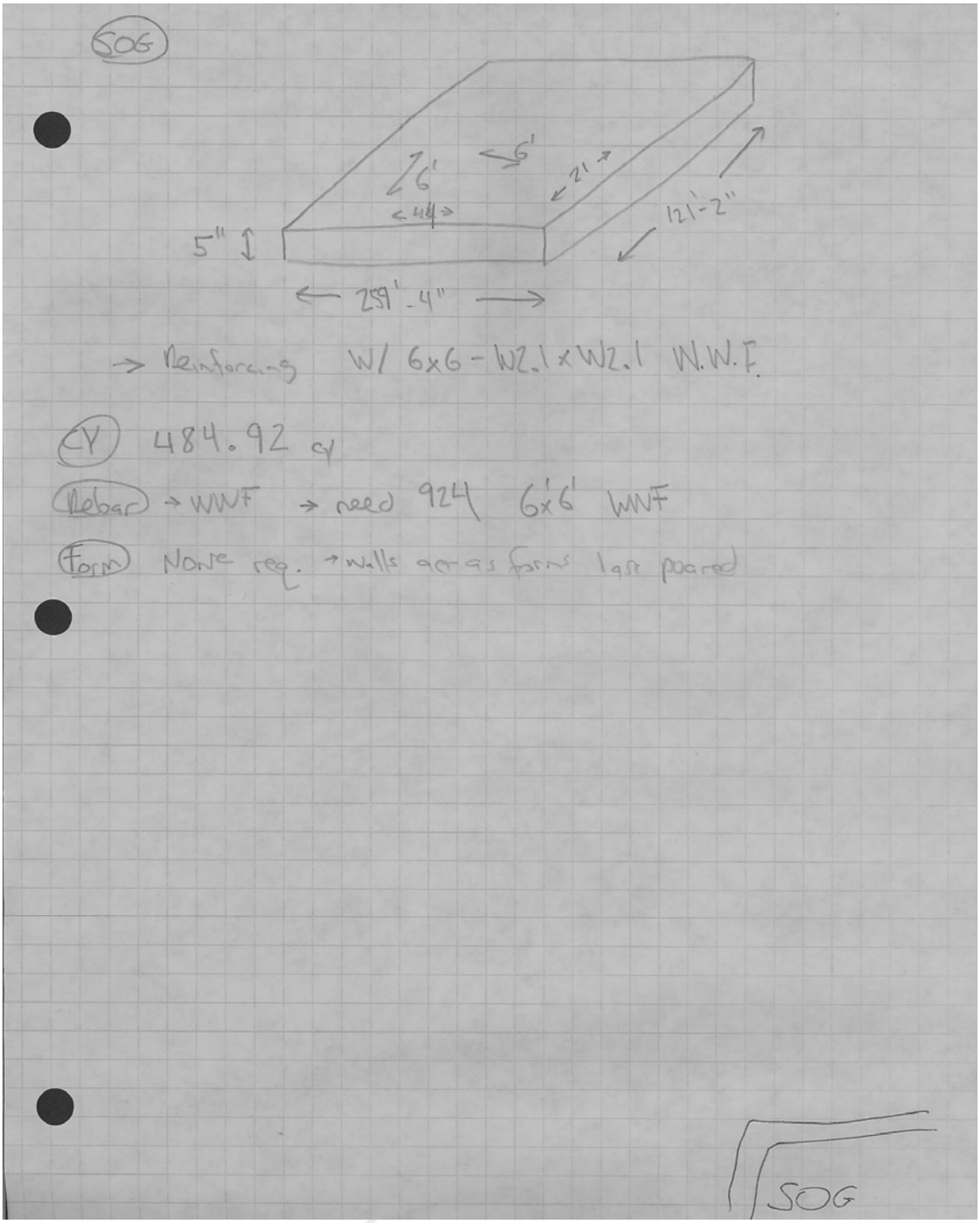

**Foundation Wall**





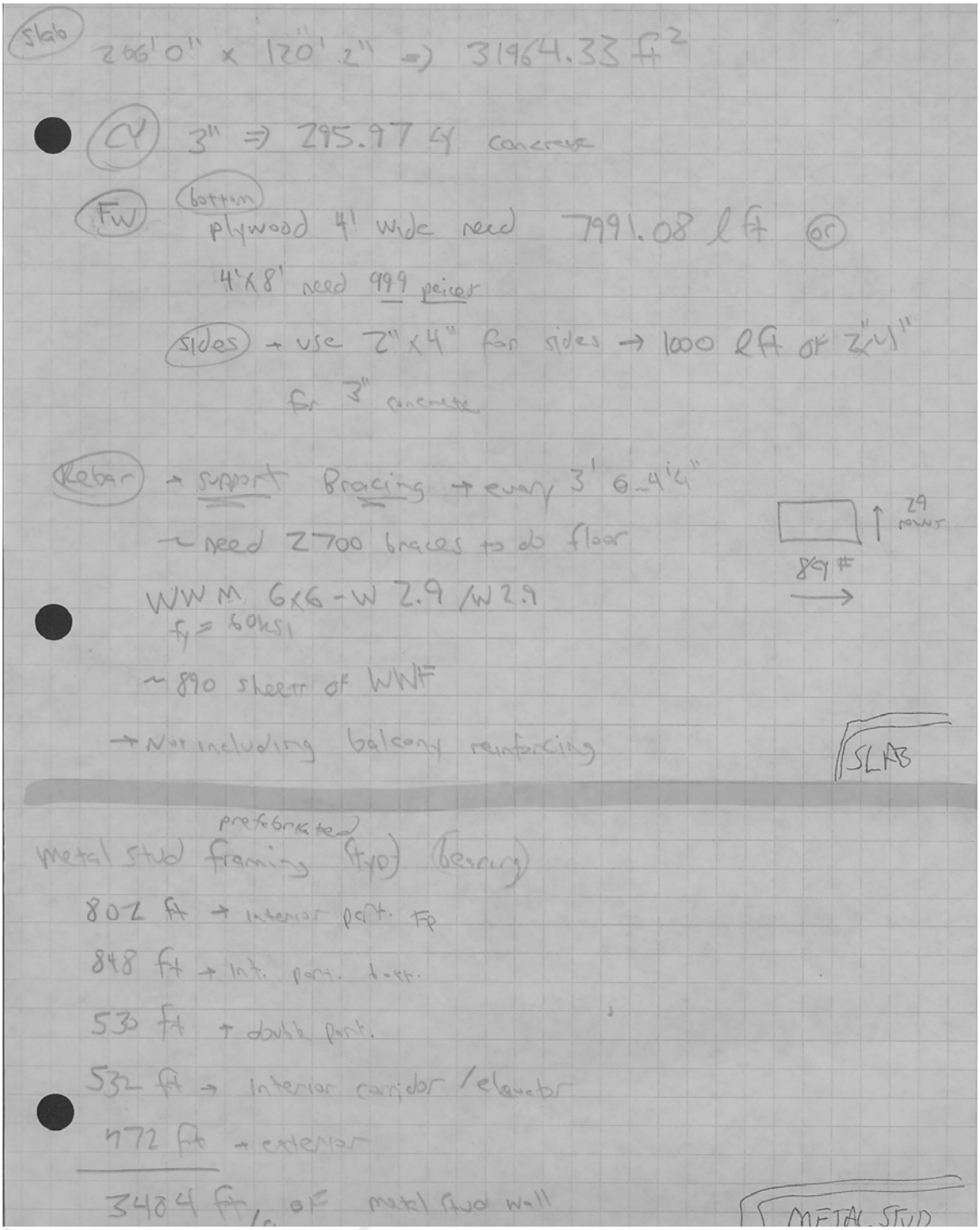

**Foundation Columns**






**Slab on Grade**



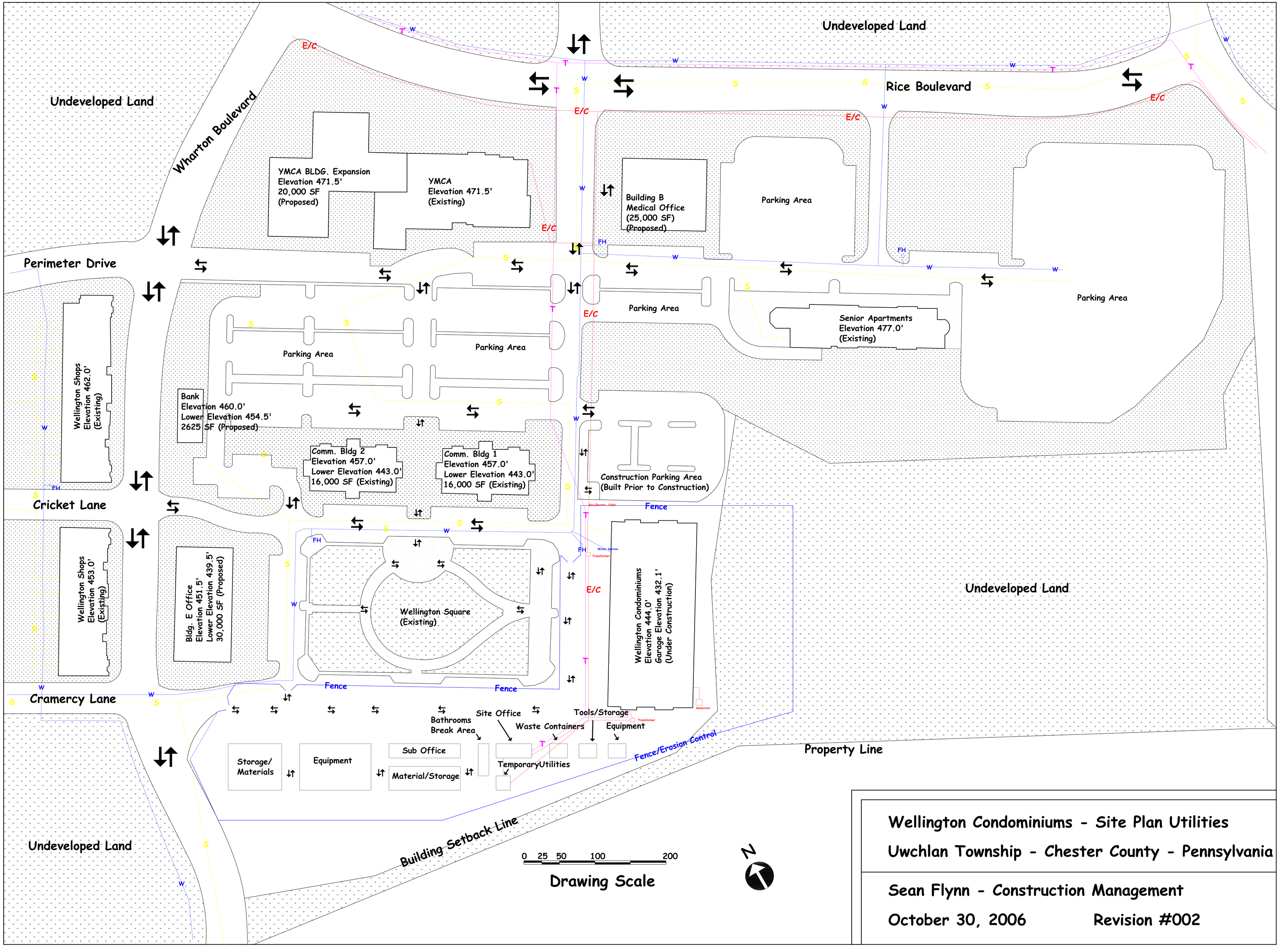



**Load Bearing Metal Studs**



## B. Appendix B – Full Site Plan with Utilities

*See the Following Attached Page*


Undeveloped Land
Undeveloped Land
Wharton Boulevard
Rice Boulevard
E/C
YMCA BLDG. Expansion
Elevation 471.5'
20,000 SF
(Proposed)
YMCA
Elevation 471.5'
(Existing)
Building B
Medical Office
(25,000 SF)
(Proposed)
Parking Area
Perimeter Drive
Parking Area
Parking Area
Parking Area
Parking Area
Senior Apartments
Elevation 477.0'
(Existing)
Wellington Shops
Elevation 462.0'
(Existing)
Bank
Elevation 460.0'
Lower Elevation 454.5'
2625 SF (Proposed)
Comm. Bldg 2
Elevation 457.0'
Lower Elevation 443.0'
16,000 SF (Existing)
Comm. Bldg 1
Elevation 457.0'
Lower Elevation 443.0'
16,000 SF (Existing)
Construction Parking Area
(Built Prior to Construction)
Fence
Cricket Lane
Wellington Shops
Elevation 453.0'
(Existing)
Bldg. E Office
Elevation 451.5'
Lower Elevation 439.5'
30,000 SF (Proposed)
Wellington Square
(Existing)
Wellington Condominiums
Elevation 444.0'
Garage Elevation 432.1'
(Under Construction)
Undeveloped Land
Cramercy Lane
Fence
Fence
Site Office
Tools/Storage
Bathrooms
Break Area
Waste Containers
Equipment
Storage/
Materials
Equipment
Sub Office
Material/Storage
TemporaryUtilities
Fence/Erosion Control
Property Line
Undeveloped Land
Building Setback Line
0 25 50 100 200
Drawing Scale
N
Wellington Condominiums - Site Plan Utilities
Uwchlan Township - Chester County - Pennsylvania
Sean Flynn - Construction Management
October 30, 2006
Revision #002