

Request for Proposal

For Development of a Parking Garage (P-1) At the New East Baltimore Community Science + Technology Park at Johns Hopkins



Forest City – New East Baltimore Partnership

Issue Date: August 27, 2009

Proposals Due: October 1, 2009

Pre-Proposal Conference: September 16, 2009

Building a great community, next door to a great research institution, in the heart of a great city

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I. Introduction

Thank you for your interest in developing the first parking garage at the Science + Technology Park at Johns Hopkins in the New East Baltimore Community. The Science + Technology Park at Johns Hopkins is an exciting and highly visible development project with strong support from the local community, Johns Hopkins University, Kennedy Krieger Institute, City of Baltimore, State of Maryland and many other constituents and stakeholders.

This RFP pertains to the development of a new parking garage (the “Project”) in East Baltimore. Forest City – New East Baltimore Partnership is seeking technical and price proposals from qualified garage developers to develop, own and operate the garage. We are providing information and attachments herein to assist in offerors’ proposal preparation and to help ensure such proposals are responsive to the submission requirements. We encourage offerors to be particularly responsive to the evaluation criteria.

II. Background Information

In 2004, East Baltimore Development, Inc. (EBDI) selected Forest City - New East Baltimore Partnership (FC-NEBP) as the master developer of the first phase of an initiative to provide economic development & community revitalization to an 88 acre portion of the East Baltimore Community (see Exhibit A – East Baltimore Community Concept Master Plan). EBDI is a non-profit 501(c)3 organization charged with leading and managing the revitalization effort of East Baltimore. EBDI works with support from a long list of partners including the City of Baltimore, the State of Maryland, and a number of local civic groups and charitable foundations. FC-NEBP has signed a Master Development Agreement with EBDI.

Forest City Science + Technology Group teamed with Presidential Partners, a group of locally experienced developers and contractors, to form Forest City – New East Baltimore Partnership, LLC. This entity is responsible for developing the first 31 acres, which is referred to as the Science + Technology Park at Johns Hopkins. Forest City Enterprises is a national, publicly traded real estate development and management company (NYSE: FCE.A) that owns and manages more than \$10.0 billion of commercial, retail, residential and mixed use developments throughout the United States. Forest City’s Science + Technology group is a premier developer of bio-parks in the United States with 2 million square feet of existing wet-lab and office facilities and 5 million square feet currently under development. For more information about Forest City, Presidential Partners or FC-NEBP please refer to the marketing material attachments and visit our websites at www.forestcity.net, www.presidentialpartnersllc.com or www.forestcityscience.net.

III. Project Description

The Science + Technology Park at Johns Hopkins and The New East Baltimore Community is a life science and residential campus located immediately north of the Johns Hopkins Medical Campus. The campus is bounded north – south by E Chase Street and E Madison St and bounded east – west by N Broadway and N. Washington Street. The first phase of development encompasses about 31 acres and is projected to cost around \$1.0 billion. It consists of approximately 1.1 million square feet of life sciences/office space; 850 residential units; up to 80,000 square feet of retail space, a hotel of at least 180 rooms, two parking garages, three acres of community parks and open space and other amenities. The residential units will offer a range of options from single family row-homes to condominiums, apartments and graduate student housing. When complete, it will be a vibrant mixed-use 24/7 community. (See Exhibit “B” – Current Master Site Plan and Exhibit C – Current Aerial Master Plan for details on the development mix and layout for the 31 acres). The life sciences buildings are labeled as “L-#”, the residential buildings/units are labeled as “R-#” and the parking garages are labeled as “P-#”. The parcel labeled “P-1” is the subject of this RFP.

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FC-NEBP is required to provide parking to satisfy the requirements of this Planned Unit Development (PUD). The PUD (Exhibit D) establishes the minimum parking requirements for both the commercial and residential uses. The current plan is to construct two structured parking garages in phases to support the parking needs of the commercial buildings and some of the higher density residential projects as well as some demand from Johns Hopkins.

IV. Campus Schedule and Ongoing Activities

1. Although market conditions will dictate the final completion date, it is anticipated that the first 31 acres of the New East Baltimore Community will be completed in approximately 7 - 9 years (2016 – 2018). The project is already well underway with sitework, infrastructure (i.e. underground utilities, curb & gutter, roads, paving, etc.) and building construction. The necessary demolition, debris removal and backfill in support of the project is complete. Utility and infrastructure work was installed along Eager St., Ashland Ave., Wolfe St., Washington St and other streets/alleys in support of the initial phase of commercial and residential buildings including the P-1 garage. This work was performed by the City and completed in early 2009. The specifics of the infrastructure work are shown on design documents that are available for viewing at FC-NEBP's office. Please schedule access to view the documents through Karen Brice at 410-900-1006.
2. While not complete, the campus is an active community with commercial and residential buildings, parks and streetscape. Over 210 rental residential units are completed and more units are currently under construction. The first life sciences building located at 855 N. Wolfe Street (totaling 279,000 gross square feet, including 18,000 GSF of retail space) was completed in April 2008, and is over 75% committed to tenants including: John Hopkins Institute of Basic Biomedical Sciences, Johns Hopkins Brain Science Institute, BioMarker Strategies, Iatrica, Howard Hughes Medical Institute, SoBran, Champions Biotechnology, Forest City-NEBP and Harbor Bank. An additional 400-450 residential units will be delivered by Summer 2012, including a 324 unit (575-bed) graduate student housing building. Further, we anticipate opening an approximately 160 – 180 key hotel in 2012.
3. First phase public improvements were completed in Spring 2008. These improvements include new sidewalks, street trees, and street lights along Ashland Avenue and portions of Rutland Avenue and N. Wolfe Street; surface parking lots totaling approximately 330 spaces; a 2/3-acre park with seating, walkways, and other site amenities.
4. On August 30, 2009 a new K-8 Elementary School will open to serve residents of the Project area. The school is located at the corner of Chase and Wolfe streets, three blocks from the P-1 site.
5. The first proposed parking garage is slated to be constructed on the P-1 site shown in Exhibit B. It is intended to serve both the immediate and near term development needs of the various commercial and residential projects. The second proposed parking garage is slated to be constructed on the P-3 site shown in Exhibit B. This parking structure is not planned to commence construction until demand is sufficient (and cannot be satisfied within the P-1 structure) and/or as required to satisfy the zoning requirements within the PUD. It is likely that P-3 will not commence construction until the proposed commercial laboratory buildings L-3 and/or L-4 are near completion.

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6. The land along the east side of Washington St, bordering the Phase I (31 acre) parcel, is planned for future further residential and commercial development, including an approximately 200,000 SF State laboratory building located directly across the street from the P-1 parcel scheduled for delivery in second quarter 2013. Planning efforts for this particular area are already underway.

V. Site Information

1. The project site ("Site") that is the subject this RFP is designated by parcel labeled P-1.
2. The Site is located along Ashland Avenue and Washington Streets. The site totals approximately 64,100 SF (215' X 298') as depicted in Exhibit E – Parcelization Plan. The site slopes down from south to north approximately 15'-0". While there is flexibility in the overall layout and design solution, the design will need to accommodate some set-back to satisfy streetscape guidelines and the shared alley between P-1 and both the adjacent graduate student housing building (R-9/10) and the residential building (R-6).
3. The awardee will be required to coordinate the design of the surrounding alley with design of adjacent projects/buildings to ensure proper coordination and functionality and will also be required to construct and pay for said alley within the scope of the Project.
4. The preexisting buildings have been demolished; related debris on the site was removed and backfill was completed in 2006.
5. A geotechnical report was prepared for a portion of the P-1 site. The report is attached (see Exhibit L) and made available for information only.
6. The currently approved maximum height limitation set-out in the Planed Unit Development (PUD) for P-1 is 65'. We are in the process of increasing the allowable height. We have received approval from the City Planning Office and UDARP and have support from various stakeholders to increase the allowable height to the 85' – 95' range. The revised PUD is scheduled to be submitted this fall and we anticipate approval by late 2009/early 2010. For the sake of this RFP and response, proposers shall assume an allowable height of 85' for the P-1 site.
7. Pedestrian and traffic flow is an important factor when designing the garage. The following provides some general information: a.) The predominant pedestrian destinations will be to the South (to the Johns Hopkins Medical Campus and the 855 N. Wolfe St. building (L-1), the first commercial laboratory building in the park), to the West/Northwest (to the graduate student housing building (R-9/10) and hotel (R-5)) and to the East to the State lab building and b.) Ashland Ave is a two-way street, Washington St is one-way street in the northbound direction and Wolfe St is a one-way street in the southbound direction.
8. Firms are encouraged to visit the site and ask questions as necessary.

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VI. Project Goals/Objectives

1. Develop a 1200+ car garage that can accommodate the L-1 Building, the graduate student housing building (R-9/10) and the proposed hotel (R-5), other high density residential and commercial buildings as well as daily commuter parking needs.
2. Design the facility to enhance the design character of the overall Park, with special emphasis given to the exterior and pedestrian/street level experience, and in a manner that coordinates with other surrounding buildings and meets all municipal planning/zoning and other agency regulations/requirements.
3. Design the garage to accommodate approximately 6,000 sf of retail space in order to activate the street elevation to the greatest extent possible, particularly on Ashland and Washington Streets.
4. Design the garage to meet or exceed the recommendations of the American Concrete Institute's Guide for the design of Durable Parking Structures.
5. Construct the facility utilizing a delivery methodology that achieves the desired summer 2012 completion date.
6. Be proactive in maintaining positive relations with the community surrounding project site.
7. Involve local, small, women owned and minority owned businesses in completion of the work necessary to satisfy the project's business requirements and goals, which include building capacity for such firms to grow and compete effectively with their mainstream counterparts. Each team must submit a participation plan; this plan should outline roles and responsibilities for each team's MBE/WBE business partner(s), consultants, and contractors as well as the majority partners' capacity building strategies. A copy of the Inclusion Requirements/Procedures for the New East Baltimore Project is included as Exhibit F:
 - a. The project baseline for Minority Business Enterprises (MBE) and Women Business Enterprises (WBE) are as follows: a.) 27% MBE and 8% WBE for construction related work and b.) 21% MBE and 13% WBE for the A/E Team as well as consultants
 - b. We also expect at least 20% MBE/WBE participation at the development level: the MBE/WBE development partner(s) shall be actively and meaningfully engaged in the development decision-making process with commensurate fee participation. (During the proposal evaluation process, greater consideration will be given to Team that demonstrate that they will exceed minimum participation requirements and/or Teams that partner with firms that are MDOT/MWBOO certified)
 - c. The team is also expected to include an MBE/WBE partner(s) who should have at least 5% equity ownership stake in the project. The qualified MBE/WBE equity ownership partner may also participate in multiple Team roles. (During the proposal evaluation process, greater consideration will be given to Teams that demonstrate that they will exceed minimum participation requirements and/or Teams that partner with firms that are MDOT/MWBOO certified)

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The following links to MDOT and MWBOO databases are provided for your convenience:

www.mdot.state.md.us and <http://cityservices.baltimorecity.gov/mwboo/>

8. Make best efforts to hire Baltimore City residents to work on this project to the extent feasible, especially with regard to construction activities. FC-NEBP is committed to increasing job opportunities for Baltimore City residents, and will work with the selected Team to identify opportunities to hire local residents.
9. Coordinate with other ongoing operations and contractors on-site to minimize disruptions and facilitate a cooperative approach to site utilization during construction.

VII. Additional Information

1. FC-NEBP will consider a ground lease or sale of the P-1 parcel.
2. FC-NEBP will formally create the P-1 parcel through the sub-division process and will convey subject parcel and development rights through a Ground Lease or Purchase and Sale Agreement (“Agreement”) between FC-NEBP and the awardee.
3. The P-1 garage will serve both commercial and residential uses and as a result, the garage will be shared. The hotel and graduate student housing developers will have parking license agreements confirming their right to a certain number of dedicated parking passes/spaces, and confirming our obligation to ensure that the garage will meet a certain occupancy threshold. There will be a charge (at whatever is deemed market rate) for parking passes/spaces.
4. We understand that sufficient demand needs to be available when the P-1 garage opens. In addition to parking demand from existing and upcoming development that will be completed in 2012-2013, Johns Hopkins has expressed a willingness to commit to provide parking demand to help fill the short term demand “gap”. Prior to execution of the Agreement, we will work with the selected developer to confirm the specific commitments of the various user groups.
5. The P-1 garage should be designed to accommodate approximately 6,000sf of retail space along the Ashland Ave and/or Ashland Ave./Washington St corner in a manner that minimizes costs and maintains garage efficiency and functionality. The retail space should be considered and separately accounted for when developing the project proforma. We will work with the garage developer to minimize the impact of the retail requirement on the project proforma. It is likely that the retail component will be separately owned and managed.
6. To further increase the scope and financial viability of the project, FC-NEBP expects to incorporate the existing interim surface parking lots into the parking supply mix and portfolio to be managed by the awardee/garage operator. This will allow additional oversell capabilities and additional revenue to the Project.
7. The design is subject to approval by FC-NEBP and EBDI. The sub developer will be responsible to follow existing design guidelines, including building architectural guidelines and streetscape guidelines as well as the requisite City approval requirements for major projects of this type.
8. There is a concept design package that has been developed for the adjacent R-9/10 graduate student housing (See Exhibit G – Graduate Student Housing Concept Drawings) and the R-6 residential

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building (See Exhibit H – R-6 Concept Design Drawings). We expect the design of the P-1 project to respect and respond to these adjacent buildings as well as to L-1.

9. The P-1 project will be subject to a Declaration of Covenants (DEC). See Exhibit J – Draft DEC for specifics. The DEC is intended to create a common scheme for the proper and uniform development and use of the land, to provide maintenance, campus (external) security services and other overall services which are appropriate and efficient for the S+T Park as a whole. The Garage Operator will contribute financially and pay a modest share of the costs of such services; at the moment the likely cost would be approximately \$20 - \$25/parking space, assessed annually. The actual amount of the sub developer's contributions will be ascertained prior to execution of the Agreement.
10. The Campus and Site is in an Enterprise Zone, Empowerment Zone and HUB Zone, which have tax advantages.
11. The public improvements for the New East Baltimore Community have been partially funded through Tax Increment Financing (TIF) which required the designation of a Special Tax District (the District). The P-1 project is located within the District. As this time, the garage is not included with the properties that may incur a special tax assessment if base property assessments are insufficient to support the TIF. Based on the planned development schedule, we do not expect this parcel to be affected. However, we are required to disclose the possibility of a future assessment to all prospective sub-developers. In any case, this special assessment has been suspended until at least June 30, 2016 (see Exhibit I – Special Tax Indemnity and Escrow Agreement).
12. The foregoing tax-related items are highlighted for convenience of offerors, and do not attempt to be a comprehensive presentation of tax-relevant matters. Offerors shall perform additional research and due diligence necessary to consider and incorporate all relevant tax issues in their proposals.
13. EBDI and FC-NEBP have entered into an agreement whereby if the New Markets Tax Credits (NTMC) program is utilized for any project, EBDI will receive 100% of the net proceeds for the NMTC's less any expenses incurred in procuring the credits.
14. LEED Certification – Forest City is committed to principles of sustainability, and has adopted such principals into the projects it develops and the properties it manages, balancing environmental resources, economic objectives and social systems. It is FC-NEBP's goal that all commercial buildings within the Science + Technology Park at Johns Hopkins, including the proposed P-1 garage, consider sustainable concepts in design, construction and operations, and pursue LEED certification to the extent it is economically feasible. Furthermore, the City of Baltimore has recently enacted an ordinance requiring Silver LEED Certification for certain commercial buildings; the P-1 garage may be subject to this legislation. Bidders are encouraged to investigate the requirements and contact Ms. Bronwyn Phillips with the City of Baltimore at (410) 396-3465 for more information.
15. The P-1 project is subject to a Stormwater Management Master Plan (SWMP) which was approved on 8/6/2009, and the garage will be required to incorporate stormwater management device(s) capable of providing water quality treatment for 1.29 acres in accordance with the SWMP. The selected developer will also need to secure City approval of its Sediment & Erosion Control plan no later than 5/4/2010. Conceptual design information and specific stormwater management requirements are provided in the SWMP documents, which are available for viewing at FC-NEBP's office. Please schedule access to view the documents through Karen Brice at 410-900-1006.

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16. FC-NEBP would prefer a long term ground lease to the Awardee but will consider an outright sale of the land. In either case, FC-NEBP and other commercial and residential building owners will require perpetual rights to lease or otherwise control a predetermined number of parking spaces in the garage to protect their substantial investment in the commercial and residential buildings serviced by the garage.
17. The City of Baltimore Development Corporation recently issued a “Notice of Funding Availability and Request for Proposals – Tax Exempt Recovery Zone Facility Bonds to Finance Private Activity Development and Expansion Projects”. FC-NEBP is exploring the possibility of responding to the RFP to acquire these “low cost” funds on behalf of the project. The eventual awardee may be asked to cooperate with such efforts. Prior to execution of the Agreement, we will work with the selected developer to determine next steps and potential use of funds if made available to the project.
18. This RFP does not obligate FC-NEBP to award a Contract nor will it reimburse firms for any costs to prepare a proposal and/or respond to this RFP.

VIII. Proposal Information/Contents

Submit a proposal responding to the items listed below in sufficient detail to provide for meaningful evaluation and assessment. Please limit your proposal response to no more than 70 pages.

1. Letter of Introduction
2. Table of Contents
3. Executive Summary explaining the primary attributes and advantages of the offeror’s proposal.
4. Team Qualifications and Project Approach
Describe team qualifications and approach in providing design-engineering, construction, development and management services for projects of similar type (i.e. parking garages with 800 spaces or more, garages with retail) and size to the garage project described herein. Describe the team’s ability to successfully develop, design, engineer and construct a project of this size and scope in a timely manner as well as to manage/operate a garage upon opening.
5. Organization and Organizational Overview
Provide an organization chart, indicating Team and primary subcontractors for design, engineering and construction, and corporate overview of major entities on your Team including proposed operator.
6. Experience – Completed Projects
Provide examples, including photos, of the most relevant (per description of project herein) completed projects with project total costs of \$15 million or more your firm has completed in the last seven years. Use the following format:

Project Name _____	Size (SF, # of spaces)_____
Owner / Client_____	Total Cost _____
Contact Person/Phone Number_____	Total Construction Cost _____
Architect_____	Actual Completion Date _____
Construction Contractor_____	Financial Structure _____

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7. Experience – Current Projects

Provide examples, including pictures, of the most relevant (per description of project herein) projects with project total costs of \$15 million or more your firm currently has ongoing. Use the following format:

Project Name _____	Size (SF, # of spaces) _____
Owner / Client _____	Total Cost _____
Contact Person/Phone Number _____	Total Construction Cost _____
Architect _____	Actual Completion Date _____
Construction Contractor _____	Financial Structure _____

8. Scheduling

Provide a summary level critical path method (CPM) schedule for both pre-closing and post-closing activities including major design, construction and development milestones and estimated completion date. Provide a narrative describing the basis of the CPM schedule including any assumptions made.

9. Subcontractors/Subconsultants

Provide a list of proposed primary subcontractors (i.e. Architect and General Contractor) and experience of their firm with projects similar to the garage project described herein as well as: a.) List of completed and currently ongoing projects similar in size, scope and type to the garage project described herein and b.) three client/owner references for each major subcontractor/subconsultant.

10. Location for Performance of Work

Indicate addresses where work will be performed. If a joint venture, indicate what work will be done by each firm and where it will be performed.

11. Design Information

Furnish conceptual layout with: a.) proposed ramping approach, pedestrian and vehicular entrance points, overall height, etc. and b.) design approach as it relates to exterior design finishes including the proposed ground level retail.

Provide pictures of existing garages, materials or other information that demonstrates intended exterior design and level of quality assumed/included in the proposer's cost model.

Provide narrative describing how intended design addresses some of the important function issues associated with a multi-story garage (e.g. queuing, wait times, ease of access for vehicles/pedestrians, etc.) and why proposed ramping approach is most appropriate solution.

12. MBE/WBE Participation and Plan

Provide a comprehensive Inclusion (i.e. minority owned businesses and women owned businesses) plan to achieve stipulated goals. Respondents' demonstration of understanding and commitment regarding the fundamental importance of MBE/WBE participation is a key factor in determining which respondents will be selected for this project.

13. Deal Structure

a. Describe proposed structure of the P-1 parcel acquisition

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14. Financial Overview

- a. Provide estimated development budget including hard costs, soft costs, contingencies and breakdown within each category. Clearly delineate escalation assumptions.
- b. Provide pro forma operating budget for project described herein including estimated parking rates, income/revenue, demand assumptions, over sell assumptions, operating expenses (including taxes and ground rent, if applicable) and other expenses/revenue sources/assumptions. Clearly delineate escalation assumptions. While we are looking to the proposer to identify the necessary revenue stream to make the garage economically feasible, we will work with the selected developer to confirm that the revenue stream from a majority of the users can be contractually guaranteed.
- c. Provide proposed financing structure, sources of debt and equity, LTV, rate of return, borrowing rate, DCR, etc.
- d. Provide evidence of access to debt and equity sources.
- e. Provide proposed land cost or ground rent amount, and other major terms including back-end participation.

15. Property Management

- a) Describe approach to property management to include operational plan, staffing plan, management approach, and safety and security considerations.

16. Additional Information

Any additional information you may wish to include should be added here, including any assumptions/qualifications.

IX. Proposal Evaluation

FC-NEBP will evaluate the firms based upon information in the response to the RFP submitted by the sub developer, interviews, investigation of projects completed by the sub developer, performance in previous undertakings, and other pertinent factors. The selected sub developer will be chosen on the basis of quality of the proposed project and factors which may include, but are not limited to: substantially meeting the stated goals and objectives for the project, purchase price/ground rent that is proposed, Team's qualifications and experience, the value of the improvements, quality of proposed design relative to the site design controls (e.g. PUD, design guidelines), MBE and WBE inclusion plan, developer's financial commitment and capabilities to undertake, complete and manage the project, as well as reasonableness of project pro-forma financial projections, including cost estimates, unit pricing, market analysis and operating expenses.

The goal is to identify a short list to invite for interviews/presentations within 30 days after receipt of proposals, and to designate a sub developer by the end of the year.

X. RFP Response Submission

If you are interested in submitting a response to this RFP, or would like to receive a list of interested firms, please send FC-NEBP your contact information (i.e. firm name, contact name, email address, firm website address, services provided (e.g. developer, operator, construction contractor, architect/engineer) to Karen Brice at karenbrice@forestcity.net. (Please specify whether you plan to submit a proposal or just want the list of firms who have expressed interest in the RFP). The information will be used for amendments, updates and as part of our outreach efforts to facilitate interaction and information sharing amongst various interested entities.

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Provide your RFP response (8 copies & 1 CD) to the address below by 4:00 pm on October 1, 2009.

Forest City – New East Baltimore Partnership, LLC
855 N. Wolfe Street, Suite #102
Baltimore, MD 21205

Please direct any questions or requests for explanation/interpretation of this RFP to John Lecker, Senior Development Manager at johnlecker@forestcity.net by no later than 2:00 pm on September 21, 2009.

All RFP related updates and information will be made available at:
http://forestcityscience.net/hopkins/staging/business_opportunities.shtml. Please make sure you check the website regularly for such updates.

XI. Project Information and Outreach Meeting

FC-NEBP encourages interested firms to make themselves familiar with the resources available in the local business community, including women and minority owned business, and to take early steps to form business relationships that will align with the above stated project goals. To this end, FC-NEBP will hold a "Project Information and Outreach Meeting" wherein the project will be presented and potential respondents will be given an opportunity to make contact with each other and with local MBE/WBE contractors and consultants. FC-NEBP will also gather contact information and make it available to all attendees and interested parties.

The meeting will be held at 1:30 pm on September 16, 2009 at 855 N. Wolfe Street, Baltimore, MD 21205. Please note that space is limited so please limit attendance to no more than two people per company. If you are interested in attending please, please RSVP to Karen Brice at karenbrice@forestcity.net

XIII. Exhibits

The following documents are attached, except as noted with regard to documents which, due to their confidential nature, require that the bidder complete and return a confidentiality agreement:

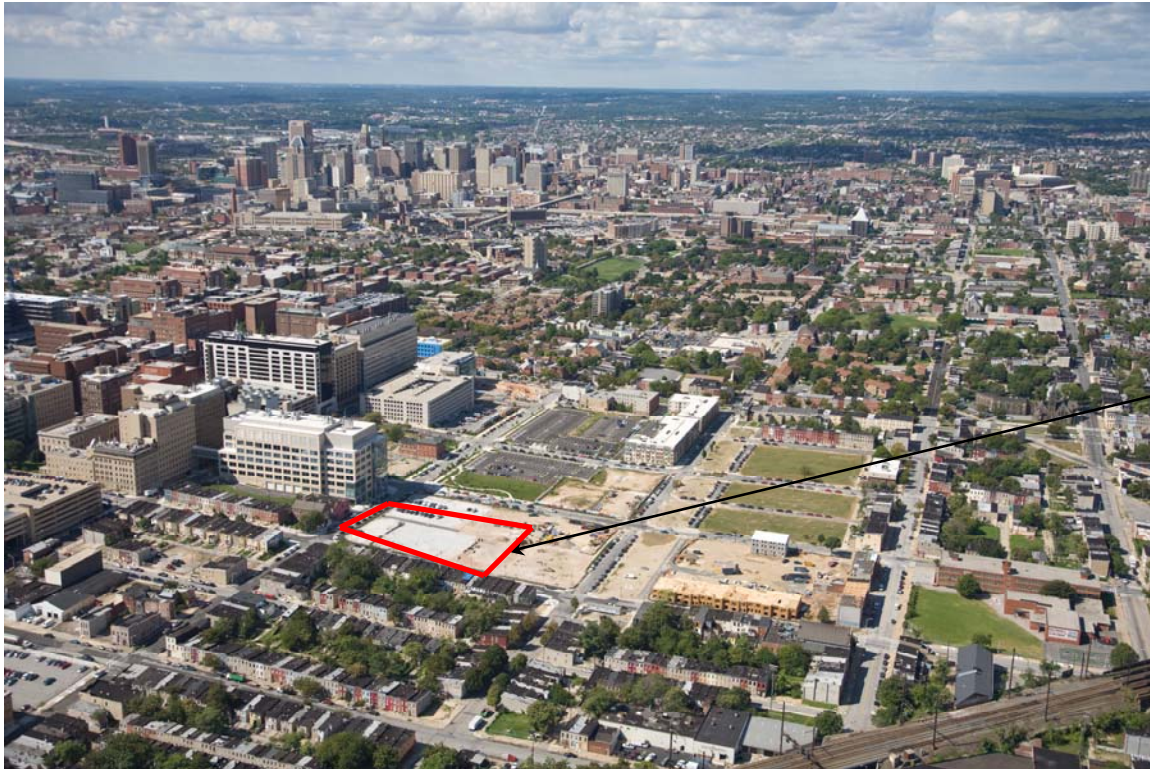
- A. East Baltimore Community Concept Master Plan
- B. Current Phase I Master Site Plan
- C. Aerial Rendering of Current Master Plan
- D. Planned Unit Development (PUD) Document
- E. Parcelization Plan
- F. Inclusion Requirements for the New East Baltimore Project
- G. Graduate Student Housing Concept Design Renderings
- H. R-6 Concept Design Renderings
- I. Draft Declaration of Covenants (requires Confidentiality agreement)
- J. Special Tax Indemnity and Escrow Agreement
- K. Confidentiality Agreement
- L. Geotechnical Report

The map illustrates the East Baltimore Neighborhood Plan, showing a grid of streets and various urban features. Key streets include Llewellyn Ave, E Hoffman St, Mura St, Henneman Ave, Prentiss Pl, and Dr. R. Broome Elementary. Parks such as Collington Sq. Elementary, Collington Sq. Park, and Community School Campus are marked. A transit line, labeled 'MARC STATION', runs diagonally through the center. Buildings are color-coded: Existing Buildings (light grey), Phase 1 (dark grey), Potential Rehab Buildings (orange), and Proposed Buildings (red). A legend in the bottom left corner defines these symbols and other features like 'REDEVELOPMENT' and 'REHABILITATION'. A north arrow is located in the bottom right corner.

Exhibit B- Current Master Site Plan



Exhibit C – Vicinity Map & Aerial Photo



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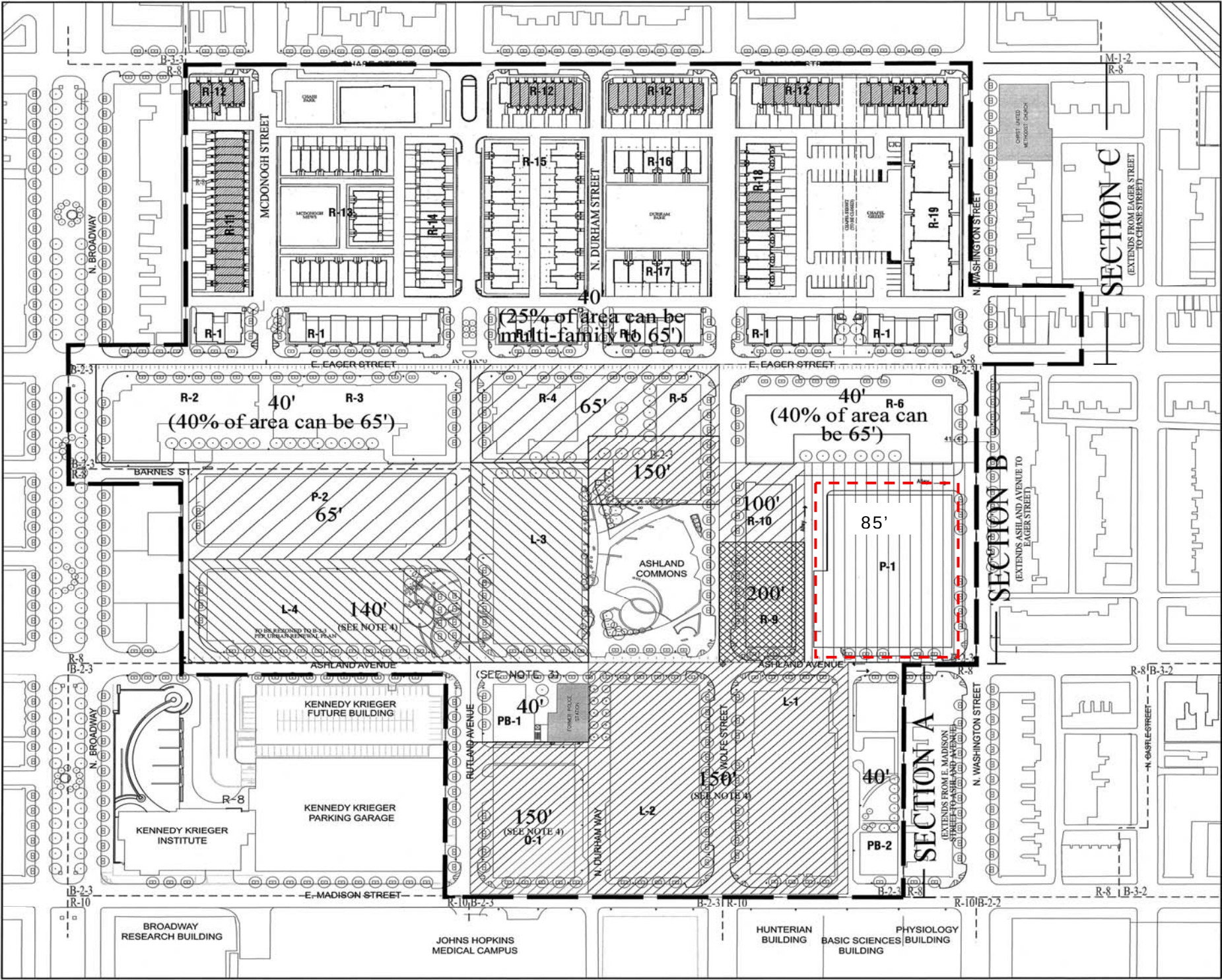
Aerial Photo of Current Site



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Aerial Rendering of Proposed Development/Site

Exhibit D – Planned Unit Development



- GENERAL NOTES:**
1. TOTAL AREA OF PUD: 33.98 ac.
 2. ZONING: R-7, R-8 & B-2-3
 3. IN THE 40' HEIGHT LIMIT AREA ADJACENT TO 1809 ASHLAND AVENUE, THE FORMER POLICE STATION BUILDING: A PEDESTRIAN ACCESS/CIRCULATION ELEMENT FOR THE OFFICE BUILDING ACCESS MAY EXCEED THE HEIGHT LIMIT, THE FINAL DESIGN OF WHICH IS SUBJECT TO PLANNING COMMISSION APPROVAL.
 4. BUILDING HEIGHTS
A. BUILDING HEIGHTS WILL BE MEASURED IN ACCORDANCE WITH THE BALTIMORE CITY ZONING CODE. THE "GENERAL HEIGHT EXEMPTIONS" ALLOWED IN THE BALTIMORE CITY ZONING CODE WILL BE APPLICABLE TO ALL BUILDINGS WITHIN THE PUD AREA EXCEPT FOR:
(G.) THOSE BUILDINGS LABELED "L" AND "O" ON THE PROPOSED DEVELOPMENT MASTER PLAN- SHEET 3 OF THE PUD.
(H.) THOSE BUILDINGS IN 4.A.G.) OF THE PLANNED UNIT DEVELOPMENT NOTES THE FOLLOWING APPLY: ANTENNAE, STAIR TOWERS, ELEVATOR ENCLOSURES, STACKS AND FLUES, AND UTILITY POLES ARE ALLOWED. THEY ARE LIMITED TO A MAXIMUM OF 15 FEET ABOVE THE ROOF AND MAY NOT OCCUPY MORE THAN 10% OF THE ROOF AREA. STACKS AND FLUES MAY EXTEND ABOVE THE 15 FOOT HEIGHT LIMIT IF THE HEIGHT EXTENSION IS REQUIRED BY THE BUILDING CODE, FOR PUBLIC HEALTH AND SAFETY MATTERS, OR FOR FUNCTIONAL REASONS.
B. LIFE SCIENCE USES SHALL HAVE NO HEIGHT EXEMPTIONS, EXCEPT AS SPECIFIED ABOVE.
 5. ASHLAND COMMONS RESTRICTIONS: THE FOLLOWING ARE BUILDING RESTRICTIONS FOR ASHLAND COMMONS:
A. NO PERMANENT ENCLOSED STRUCTURES ARE ALLOWED. ANY NON-ENCLOSED PERMANENT STRUCTURE MUST BE FOR A PUBLIC USE AND MUST OBTAIN FINAL DESIGN APPROVAL FROM THE PLANNING COMMISSION.
B. TEMPORARY STRUCTURES WILL BE ALLOWED AS LONG AS THEY ARE EVENT-BASED AND NOT A RECURRING REGULAR USE.
C. ANY OUTDOOR USE OF LAND ADJOINING ASHLAND COMMONS, SUCH AS A SIDEWALK CAFE, MUST ADJUT THE PRIMARY STRUCTURE TO WHICH IT IS AN ACCESSORY USE.

LEGEND:

--- PUD LIMITS	HEIGHT AREA 140'
- - - SECTION BOUNDARIES	HEIGHT AREA 100'
- - - ZONING LINE	HEIGHT AREA 95'
EXISTING BUILDINGS TO BE RENOVATED	HEIGHT AREA 70'
HEIGHT AREA 200'	HEIGHT AREA 65'
HEIGHT AREA 150'	HEIGHT AREA 40'

PROPOSED MASSING PLAN SHEET 2 OF 4
**NEW EAST BALTIMORE COMMUNITY
BUSINESS PLANNED UNIT DEVELOPMENT**

DATE: SEPTEMBER 15, 2008

DATE	SEPTEMBER 15, 2008
BY	STV INCORPORATED
CHECKED BY	STV INCORPORATED
APPROVED BY	STV INCORPORATED



FOREST CITY - NEW EAST BALTIMORE PARTNERSHIP, LLC.

**NEW EAST BALTIMORE COMMUNITY
BUSINESS PLANNED UNIT DEVELOPMENT**



STV Incorporated
Engineers/Planners/Surveyors
7125 Ambassador RD, Suite 200
Baltimore, MD. 21244-2722

Exhibit E – Parcelization Plan

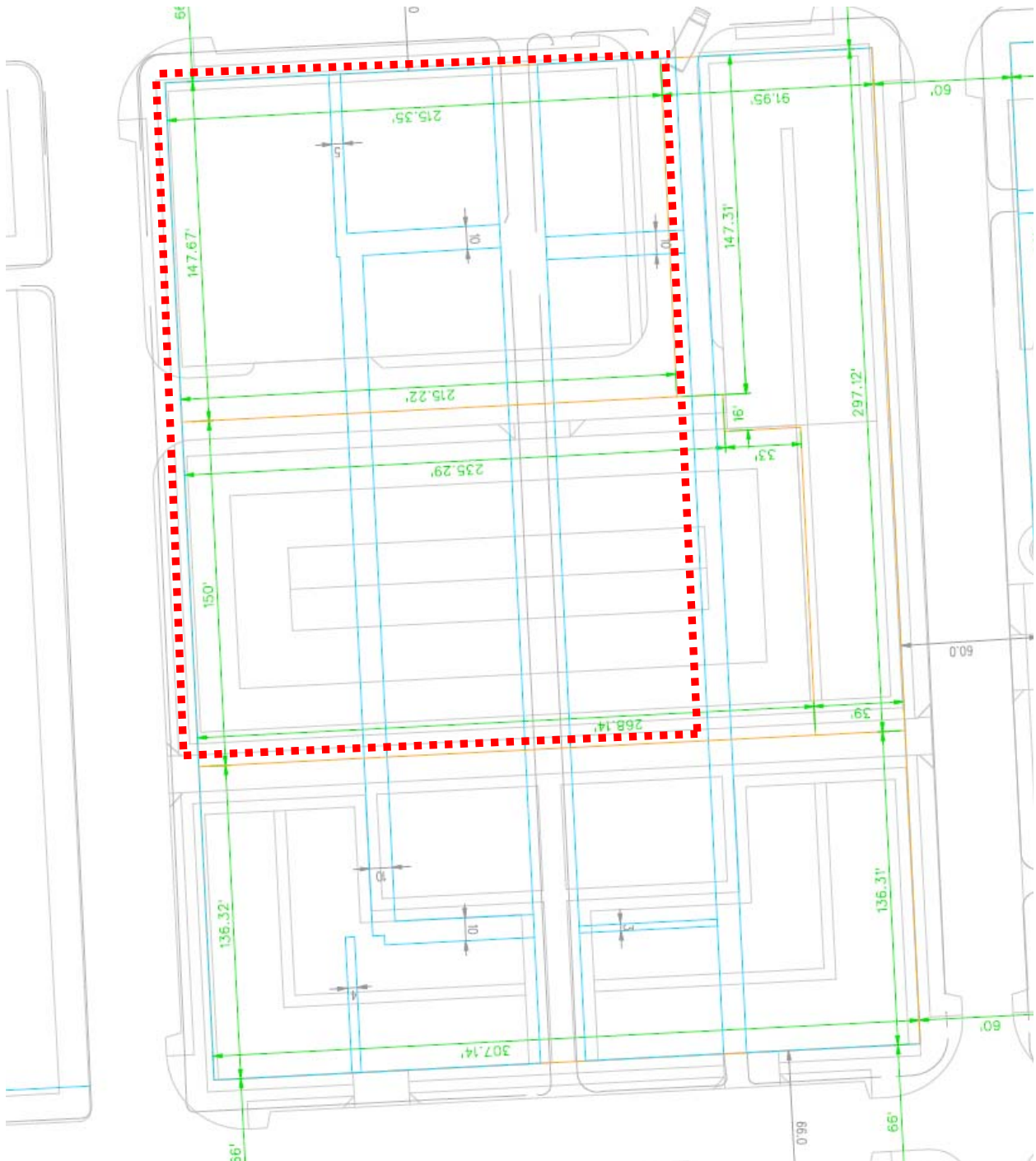


Exhibit F – Inclusion Requirements and Procedures

EBDI ECONOMIC INCLUSION COMPLIANCE PLAN

EBDI is committed to provide fair and representative opportunities for Minority-Owned, Women-Owned, and Locally-Based Business Enterprises on its Vending, Professional Services and Construction Projects and, in turn, EBDI expects the Developer to make the same commitment. The Developer shall not, and furthermore, shall ensure that its Contractors and Subcontractors shall not, discriminate on the basis of race, color, religion, sex or natural origin in the award and performance of contracts to be utilized in constructing the Area A Project. Furthermore, affirmative action will be taken, consistent with sound procurement policies and applicable laws, to ensure that MBE/WBE/LBE firms are afforded a fair and representative opportunity to participate in the contracts relating to the Area A Project.

Consequently, the successful Development Team shall be contractually required to meet or exceed the City of Baltimore's programmatic goals for creating opportunities for minority-owned (African American, Asian American, Hispanic American, or Native American) and women-owned (51% ownership) businesses in compliance with City Council Ordinance 211 and the Mayor's Executive Order 610, which were incorporated by reference in the Agreement For Minority Inclusion in the East Baltimore Housing/Biotech Park Development Project dated April 15, 2002 (the "Minority Inclusion Agreement"). Those goals, developed in conjunction with an annual disparity study, ensure that appropriate levels of contracting is conducted with minority-owned and women-owned businesses, based on the diversity, depth of talent and entrepreneurial capabilities of the population of the City of Baltimore, the City has adopted the following participation levels for certified minority-owned business enterprises ("MBE's") and women-owned business enterprises ("WBE's") which developers on City-assisted projects are required to meet or exceed in terms of overall contracting dollars:

Construction

MBE's - 27%

WBE's-8%

Architectural and Engineering

MBE's-21%

WBE's - 13%

General Services

MBE's - 17%

WBE's - 9%

In addition to complying, at a minimum, with the above-referenced contracting goals, the Developer shall use its best practical efforts to meet or exceed the minimum levels of MBE and/or WBE participation levels for specific segments of the construction industry which are included in the Minority Inclusion Agreement. The individual segments and corresponding goals, divided according to the three general categories listed above, are as follows:

Exhibit F – Inclusion Requirements and Procedures

Construction

Project Management 13.5%
Demolition 30.5%
Rehabilitation 30.5%
New Construction 30.5%

Architectural and Engineering Planning

13.5%
Design and Architecture 17%
Engineering 17%

General Services

Legal 13.5%
Accounting 13.5%
Real estate services 13.5%
Financing 13.5%
Investments/Capital 13.5%
Property and equipment financing 13.5%
Promotion 13.5%
Facilities Management/Maintenance 13.5% Property
Management 13.5%
Laboratory and office supplies 9%
Disposition Services 13.5%
Reprographics 13.5%
Delivery Services 13.5%
Light manufacturing 13.5%
Research and Development 13.5%

These goals are percentages of the total dollar amounts of all contracts let by the Developer for the construction and/or purchase of goods and services for the Area A Project. As such, all change orders shall be included in the final contract amount against which these goals will be measured.

EBDI is further committed to ensuring compliance with the training and employment requirements of Section 3 of the Housing and Urban Development Act of 1968 ("Section 3"), which governs much of the federal funding expected to be used in this project. Section 3 requires that, to the greatest extent feasible, opportunities for training and employment generated by a Section 3 covered contract (i.e., a contract funded with federal funds) be given to public housing and other low income persons residing in the metro area, and that subcontracts be awarded to businesses located in or substantially owned by persons residing in the area of the project (East Baltimore). The Developer will be expected to use its best practical efforts to locate and contract with locally-owned business enterprises ("LBE's"), i.e. businesses based within the Project area, and/or businesses which count as employees a substantial number of local residents.

The Developer shall not be required to engage MBEs, WBEs, or LBEs that are not the lowest responsible and qualified bidder, or that otherwise are not competitive with respect to quality, service, delivery time or price.

Exhibit F – Inclusion Requirements and Procedures

EBDI requirements relative to monitoring good faith efforts of Developer shall include the following:

The Developer shall submit copies of signed contracts and purchase orders with MBE/WBE/LBE contractors and subcontractors.

At the conclusion of work, the Developer shall provide actual dollar amounts paid to MBE/WBE/LBE contractors and subcontractors.

All on-site contractors and subcontractors selected by the Developer to work on the Area A Project shall submit "certified" payrolls listing the following items for all on-site employees:

1. Full name
2. Social Security number
3. Full address
4. Trade classification (e.g., laborer, carpenter, apprentice, electrician, plumber, foreman)
5. Gender
6. Race
7. Hours worked
8. All withholding (e.g., laborer, local, state, FICA, etc.)
9. Name of Contractor and Indication of Prime for Subcontractors
10. Name of Project

Certified payroll reports shall be signed by an authorized company officer.

The Developer shall ensure that each contractor and subcontractor selected to work on the Area A Project shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the contractor's and/or subcontractor's commitments under this subparagraph and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The Developer shall comply with all applicable requirements of any federal, state or local law ordinance or regulation relating to affirmative action equal opportunity and nondiscrimination in employment, and shall use its best efforts to meet all local goals relating there to.

EXEMPTIONS

Exempted Contracts

EBDI recognizes that in certain limited circumstances, compliance with this Equal Employment Opportunity MBE/WBE/LBE Compliance Program will not be feasible, nor in the best interest of EBDI. With the approval of EBDI, the following contracts may be exempted:

Exhibit F – Inclusion Requirements and Procedures

- A. A vending contract, for equipment, materials, services and supplies where the total dollar amount of the contract- is less than Ten Thousand Dollars (\$10,000.00);
- B. A construction contract where the total dollar amount of the contract is less than Ten Thousand Dollars (\$10,000.00);
- C. A professional or personal services contract where the total dollar amount of the contract less than Ten Thousand Dollars (\$10,000.00);
- D. Any public exigency or emergency contract for which the nature of the emergency will not allow for a delay which would occur from competitive solicitation.

Every effort will be made to assure that small MBE/WBE//LBE firms in the Project Area and in the Middle East Baltimore Area are included in the soliciting and award of contracts under Ten Thousand Dollars (\$10,000), in the areas referred.

Certification - Legitimate MBE/WBE/LBE

- A. To ensure that only businesses which are owned, managed and controlled in both form and substance by MBE/WBE/LBE's participating in the Area A Project, all MBE/WBE/LBE businesses, including joint ventures and nonprofit organizations, must be certified under the Minority Business Enterprise Program of the Maryland Department of Transportation, pursuant to Title 14, Subtitle 3 of the State Finance and Procurement Article of the Annotated Code of Maryland or by the City of Baltimore's Minority and Women's Business Opportunity Office pursuant to Section 28 of Article 5 of the Baltimore City Code (2000 Edition). LBEs shall be defined as businesses which maintain offices and/or facilities with street addresses in the following zip codes: 21202, 21205, 21206, 21213, 21214, 21218, 21224, 21231, 21251, 21287.
- B. MBE/WBE/LBE certification shall not be determinative of Developer's financial or technical ability to perform specified work. EBDI reserves the right to evaluate the Developer's, and any of it's proposed contractor's or subcontractor's, ability to satisfy financial, technical, or other criteria separate and apart from certification before or after bid opening
- C. EBDI recognizes that certified MBE/WBE/LBE's may be de-certified by the certifying governmental entity. Any business which has been de-certified shall not be eligible to participate in EBDI's MBE/WBE/LBE inclusion plan.
- D. EBDI reserves the right, if there is cause to do so, to refuse a certification provided by a certifying agency.

Good Faith Non-Compliance

Exhibit F – Inclusion Requirements and Procedures

- A. In cases where EBDI has cause to believe that Developer, acting in good faith, has failed to comply with the provisions of the plan, EBDI shall attempt to resolve the noncompliance through conciliation and persuasion.
- B. In conciliation, the Developer must satisfy EBDI that they have made their "Best Efforts" to achieve the agreed upon participation goals by certified MBE/WBE/LBE's. "Best Efforts" on the part of the Developer include:
 - 1. Entering into a contractual relationship with the designated MBE/WBE/LBE in a timely manner, and fulfilling all contractual requirements.
 - 2. Notifying both the certified MBE/WBE/LBE contractor and EBDI of any problem in a timely manner.
 - 3. Requesting assistance from EBDI in resolving any problems with certified MBE/WBE/LBE's.
 - 4. Making every reasonable effort to assist the certified MBE/WBE/LBE in the performance of its contract with the Developer.

Willful Non-Compliance

- A. In cases where EBDI has cause to believe that the Developer, or any contractor or subcontractor hired by the Developer, has failed to comply with the provisions of the plan, they shall be empowered to conduct an investigation.

STANDARD OPERATING PROCEDURES FOR EFFECTIVE COMPLIANCE

In an effort to facilitate communications between the "Project Team" (Developer / Contractor or Sub-developer / Contractor) and the "EBDI Inclusion Team" (Director of Inclusion, East Baltimore Development Inc.; and EBDI's designated representatives (as of April 17, 2006, the Greater Baltimore Urban League and the Greater Philadelphia Urban Affairs Coalition), the following Standard Operating Procedures for Effective Compliance (SOP) are established. These procedures outline the meetings and information needed to report the inclusion activities as required by the EBDI Economic Inclusion Compliance Plan attached as Schedule E to the Master Development Agreement.

- 1) The Project Team will inform the EBDI Inclusion Team (via mail, email or fax) of all bid packages /solicitations, prior to their mailing, with inclusion language, due dates and the anticipated list of firms that will receive the solicitation at least one week prior to distribution. The EBDI Inclusion team may provide a list of additional certified M/W/LBE firms which can be included in the bid solicitations.
- 2) The Project Team will inform the EBDI Inclusion Team via mail, email or fax of all bid addenda and or revisions.

Exhibit F – Inclusion Requirements and Procedures

- 3) The Project Team shall set up meetings with the EBDI Inclusion Team and prospective first tier subcontractors(s) to discuss the bidders approach to inclusion on the project. At the discretion of the Project Team, this meeting may be dedicated to the topic of inclusion or the EBDI Inclusion Team may attend a portion of a meeting with a broader agenda during the time inclusion would be discussed. In addition, the EBDI Inclusion Team will verify the certification status of any and all M/W/LBE firms that the bidders will use to achieve their inclusion goals
- 4) The Project Team will provide to the EBDI Inclusion Team, within fifteen days of execution, copies of signed subcontracts and purchase orders with M/W/LBE contractors and subcontractors (or such lesser documentation as the EBDI Inclusion Team may deem satisfactory) On a monthly basis, the Project Team will provide reports including all contract changes, revisions and payments to date, and will furnish signed lien waivers and/or relevant affidavits documenting payment to all M/W/LBE firms.
- 5) The Project Team will furnish to GPUAC in a controlled and confidential manner, certified payroll records for all hourly employees working on the project site. These certified payrolls and the contents therein, will be kept confidential and stored in a secured area. Certified payrolls will be submitted on a monthly basis and will include the following

Full name

Social Security number

Complete worker address (including city, state and zip code)

Trade classification (e.g., laborer, carpenter, apprentice, electrician, plumber, and foreman)

Gender

Race

Hours worked

All withholding deductions (e.g., laborer, local, state, FICA, etc.)

Name of Contractor and Indication of Prime or Subcontractors

Name of Project

Rate of pay

Gross pay

Net pay

Adherence to these Standard Operating Procedures will allow the EBDI Inclusion Team to monitor the good faith efforts of the Project Team and report the East Baltimore Project's Economic Inclusion activities to the project's stakeholders on a monthly basis.

Exhibit F – Inclusion Requirements and Procedures

FORESTCITY-NEW EASTBALTIMORE PARTNERSHIP

CONSULTANT PAYMENT AFFIDAVIT

To be completed and submitted by the consultant within 10 working days following receipt of each progress payment from the Prime Contractor.

To: Project Manager, Forest City-New East Baltimore Partnership

From: Consultant _____ Date: _____

List the following information for each progress payment received. Use additional sheets to include complete payment information for all subconsultants and vendors utilized on this contract. Failure to submit all required information may lead to partial withholding of progress payment.

Contract No. _____ Contract Title: _____

Progress Payment No. _____ Period Ending _____

Total Contract Award: \$ _____ Amount Received \$ _____

Date Received: _____ Check No. _____

SUBCONSULTANT NAME	BUSINESS ADDRESS	AMOUNT PAID	CONTRACT BALANCE	PAYMENT DATE	CHECK NO.	M/W/ LBE	% WORK DONE

I/We declare under penalty of perjury under the laws of the State of Maryland that the above information is complete, that the tabulated amounts paid to date are accurate and correct.

Prime Consultants, including each joint venture partners, must sign and notarize this form (use additional sheets if necessary)

Owner Representative

Owner Representative

Owner Representative

Name

Name

Name

Title

Title

Title

Firm Name

Firm Name

Firm Name

Exhibit F – Inclusion Requirements and Procedures

EAST BALTIMORE DEVELOPMENT, INC. ECONOMIC INCLUSION PROGRAM

MINORITY SUBCONTRACTOR PAYMENT CERTIFICATION FORM

DEVELOPER: _____

PROJECT: _____

SUBCONTRACTOR: _____

Please read carefully before Completing.

This certifies that my company invoiced and received during the period of _____, _____ to _____, _____, the sum of \$ _____ for work performed, services rendered and/or materials supplied on the above Project.

Company Name: _____

By: _____

Signature

Printed Name: _____

Title: _____

P1 Parking Garage Request for Proposal

Exhibit G – Graduate Student Housing Concept Design Renderings



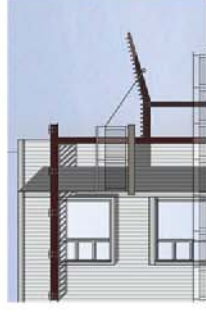
Exhibit H - R-6 Concept Design Renderings



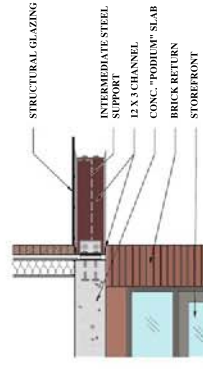
SOUTH ELEVATION



EAST ELEVATION



ROOF DECK CANOPY DETAIL



CORNER CANOPY DETAIL

CORNER ENTRANCE DETAIL



Exhibit I – Draft Declaration of Covenants

Due to the confidential nature of this document, the bidder must complete and return a confidentiality agreement. (See Exhibit K). Please send an executed to copy Karen Brice at karenbrice@forestcity.net

Exhibit J – Special Tax Indemnity and Escrow Agreement

Due to the confidential nature of this document, the bidder must complete and return a confidentiality agreement. (See Exhibit K). Please send an executed to copy Karen Brice at karenbrice@forestcity.net

Exhibit K – Confidentiality Agreement

CONFIDENTIALITY AGREEMENT

THIS CONFIDENTIALITY AGREEMENT (“Agreement”), dated as of this _____ day of _____, 2008 by and between **FOREST CITY-NEW EAST BALTIMORE PARTNERSHIP, LLC**, a Maryland limited liability company (“Disclosing Party”), and _____, a _____ (“Receiving Party”, with Disclosing Party, the “Parties”).

RECITALS

A. Disclosing Party will be providing Receiving Party with certain information for purposes of exploring a possible business or other relationship at the Science + Technology Park in Baltimore, Maryland (the “Possible Transaction”).

B. The information made available by Disclosing Party to Receiving Party hereunder is confidential to the Disclosing Party, and the Disclosing Party is unwilling to make such information available to the Receiving Party absent the agreement that the Receiving Party will not disclose the information to third parties or use the information other than for the purposes of the Possible Transaction.

C. Receiving Party is willing to hold in confidence and limit its use of Confidential Information disclosed to it by Disclosing Party pursuant to the terms of this Agreement.

NOW THEREFORE, in consideration of the foregoing and the mutual covenants herein contained, the Parties agree as follows:

1. Confidential Information. “Confidential Information” includes any and all information or data, whether in oral, audio, visual, written or other form, communicated by Disclosing Party to Receiving Party which is either identified as confidential or which by its nature is generally considered proprietary and confidential (regardless of whether such information is specifically labeled as such) including but not limited to the financial information to be provided by Disclosing Party to Receiving Party hereunder. “Confidential Information” shall also include all information not generally known to the public which relates to any transaction or potential transaction between the Parties, or the business of the Disclosing Party and/or any contact, client, or customer of the Disclosing Party, including but not limited to financial results, proprietary technology, know-how, information relating to customers and customer contacts, pricing, contracts, costs, other financial information, merchandising and marketing techniques and computer programs and software used by the Disclosing Party.

Notwithstanding the foregoing, the term “Confidential Information” shall not include information which: (i) is known to the Receiving Party before disclosure by the Disclosing Party; (ii) is or becomes generally available to the public other than as a result of disclosure by the Receiving Party; or (iii) becomes available to the Receiving Party on a non-confidential basis from a source other than the Disclosing Party, provided that source is not known to be bound by a confidentiality agreement with respect to such information.

2. Non-Use and Non-Disclosure/Restrictions on Contacts

(a) Receiving Party shall maintain all Confidential Information it receives or otherwise obtains from the Disclosing Party in confidence and shall not disclose such information to any other person except its employees who have a need to know for the purposes expressly contemplated herein, or others as may be expressly permitted in writing under this Agreement. Receiving Party shall use at least that standard of care which it accords its own proprietary and confidential information to protect the Confidential Information.

(b) Receiving Party agrees that at no time shall it use or knowingly authorize any other person or entity to examine, use or derive benefit from the Confidential Information (other than for the purposes of the Possible Transaction) without the Disclosing Party's express written consent. Receiving Party shall not disclose any Confidential Information to anyone other than as permitted under Section 2(a) above and to those additional third parties authorized in writing by the Disclosing Party who have a reasonable need for such Confidential Information, which individuals have been advised of the confidential nature of the information and have agreed in writing to be bound by the terms of this Agreement (other than Section 2(c) below, which binds only the parties themselves).

(c) Except with the express prior written consent of a Disclosing Party (which consent Disclosing Party may grant or withhold in its absolute discretion), Receiving Party shall not make, attempt to make, or permit or cause to be made, either directly or indirectly, any unpermitted use of Confidential Information received from the Disclosing Party and/or any contact with or approach to, or otherwise to deal or be involved with, any other potential participants in connection with the project(s) for whom the Confidential Information was provided or the introduction was made.

3. Disclosure Required by Law. Notwithstanding the provisions of Section 2, Receiving Party may disclose any Confidential Information if required by order of any court or other governmental, administrative, regulatory or self-regulatory body, provided that the Receiving Party shall, if permitted, promptly notify the Disclosing Party thereof and shall cooperate with the Disclosing Party in obtaining (at the Disclosing Party's expense) a protective or equivalent order.

4. Agreement Not to Disclose Negotiations. Receiving Party shall keep confidential and not disclose to any third party the fact that discussions or negotiations are taking, or have taken, place concerning a possible business relationship or transaction, and shall keep confidential any proposed terms as to the Possible Transaction. Notwithstanding the foregoing, Receiving Party may make such disclosure if required by law, rule or regulation, as provided in Section 3.

5. Ownership and Implied Rights. All Confidential Information, whether embodied in original documents or other form of media, copies of such, or documents or other media prepared or produced using Confidential Information, shall remain the exclusive property of the Disclosing Party and nothing in this Agreement shall be deemed to grant the Receiving Party any rights in or to the Confidential Information, or any part thereof.

6. Restrictions on Duplication. The Receiving Party shall not duplicate any Confidential Information, except as may be strictly necessary to carry out the above stated purposes.

7. Return of Materials. Except to the extent prohibited by any applicable law, rule, regulation, code of ethics or professionalism or by a competent judicial, governmental, supervisory or regulatory body, upon completion of the purposes stated above, or upon the Disclosing Party's earlier written request, the Receiving Party shall promptly return all materials incorporating Confidential Information and all copies of the same to Disclosing Party, except for copies retained as part of the Receiving Party's legal files, and shall cause any authorized third parties to whom disclosure was made to do the same.

8. Breach.

(a) In the event of Receiving Party's breach of this Agreement, Disclosing Party shall have the right to: (i) demand the immediate return of all Confidential Information; (ii) seek an injunction relief to prevent such breach or to otherwise enforce the terms of this Agreement, and (iii) pursue any other remedy available at law or in equity;

(b) Receiving Party specifically acknowledges that the unauthorized disclosure of Confidential Information may result in irreparable harm for which there may be no adequate remedy at law and, therefore, agrees that in the event of any unauthorized disclosure, Disclosing Party shall be entitled to seek an injunction and, further, that no bond shall be required. This remedy shall be in addition to any other remedy available at law or in equity.

9. Miscellaneous.

(a) *Governing Law.* This Agreement shall be governed by and construed in strict accordance with the laws of the State of Ohio without resort to choice of law or conflict of law principles.

(b) *Waiver.* No waiver of any provision of the Agreement shall be effective unless in writing and executed by the party waiving the right. Failure to properly demand compliance or performance shall not constitute a waiver of a party's rights hereunder.

(c) *Severability.* If at any time during the time of this Agreement any provision hereof proves to be or becomes invalid or unenforceable under any applicable law, then such provision shall be deemed modified to the extent necessary in order to render such provision valid and enforceable; if such provision may not be so saved, it shall be severed and the remainder of this Agreement shall remain in full force and effect.

(d) *Term/Termination.* This Agreement shall remain in force for a period of the earlier of: (i) the consummation of a transaction arising out of the Possible Transaction or (ii) one year from the date hereof unless extended in writing by the Parties.

(e) *Relationship of the Parties.* Nothing in this Agreement shall be construed as making either party the partner, joint venture, agent, employer, or employee of the other. Unless authorized in writing by the Disclosing Party, Receiving Party shall not have the

authority to make any statements, representations or commitments of any kind, or to take any other action which shall be binding on the Disclosing Party.

(f) *Counterparts/Facsimile Signature.* This Agreement may be executed in counterparts, each of which shall be deemed an original, and all of which together shall be deemed to be one and the same document. This Agreement may be executed and delivered by electronic or facsimile transmission and such electronic or facsimile transmission shall have the same effect as the delivery of original counterparts.

10. Authorization. Each of the Parties represents and warrants that (a) the person executing and delivering this Agreement on its behalf is duly authorized to do so for itself; (b) this Agreement has been duly executed and delivered and is a valid and binding agreement enforceable against it in accordance with the Agreement's terms; and (c) entry into this Agreement by a party does not violate the terms or conditions of any other agreement to which a party is bound or otherwise legally obligated.

IN WITNESS WHEREOF, the Parties have executed this Agreement the day and year first above written.

**FOREST CITY-NEW EAST BALTIMORE
PARTNERSHIP, LLC**

By: FC EAST BALTIMORE, INC.,
Its: Member

By: _____
Name: _____
Title: _____

By: _____
Name: _____
Title: _____

Exhibit L – Geotechnical Report

**Geotechnical Engineering Study, East
Baltimore Development, P-1 Parking
Garage, Eager and Wolfe Streets,
Baltimore, Maryland (DWK Contract
Number 05176.D)**

D. W. KOZERA, INC.
PROFESSIONAL ENGINEERS & GEOLOGISTS

March 20, 2006

Forest City Commercial Group/Boston
38 Sidney Street
Cambridge, Massachusetts 02139

Attn: Mr. Paul Hickey, P.E.

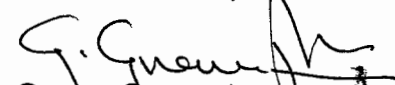
Subject: Geotechnical Engineering Study, East Baltimore Development,
P-1 Parking Garage, Eager and Wolfe Streets, Baltimore,
Maryland (DWK Contract Number 05176.D)

Dear Mr. Hickey:

This report presents the results of our geotechnical study of the proposed new seven story parking garage to be constructed on this site in Baltimore, Maryland. This report was prepared in accordance with our contract dated November 10, 2005, revised December 8, 2005.

We appreciate the opportunity to be of service to you on this project. Please contact us if you have any questions concerning this report.

Very truly yours,
D.W. KOZERA, INC.


Gnana Gunaratnam
Geotechnical Engineer

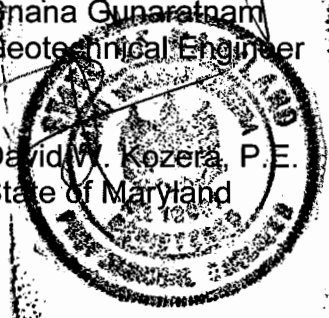

David W. Kozera, P.E.
State of Maryland

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Appendix A	Test Boring Logs (8)
Appendix B	Lateral Load Analysis (11)
Appendix C	Seismic Design Criteria (2)
Appendix D	Draft Drilled Shaft Specifications (18)

This report summarizes the geotechnical investigation that D.W. Kozera, Inc. (DWK) conducted for the planned 7-story parking garage located between Wolfe and Madison Streets and Ashland and Eager Streets in Baltimore, Maryland. The work was conducted in accordance with our proposal for this Geotechnical Engineering Study, dated November 10, 2005 and December 8, 2005.

The planned parking garage is expected to be 7 -stories having a lower level at EL 68. This will require cuts of up to approximately 4-12 -feet . This will also require a temporary excavation support system be installed along the south side of the site.

For the geotechnical study, we completed a subsurface exploration program which included eight soil test borings drilled to depths of 60 to 80-feet below the ground surface. Based on our subsurface explorations, the site appears to be underlain by a surface layer of man-made Fill, which in turn is underlain by the Potomac Group deposits of the Coastal Plain Physiographic Province. Below these soils the top of the residual profile was encountered at 50 to greater than 80-feet from the ground surface.

Foundation support for this Parking Garage Building can be provided using drilled shafts (caissons). These shafts are expected to range from 36 to 60-inch diameter and extend to depths of 50 to 60-feet. Reinforcing steel in the shafts should extend to a minimum depth equal to 1/3 the shaft length.

More detailed design recommendations and construction considerations for foundation support are contained in the body of the report.

The proposed parking garage building project is located west of Wolfe Street and between East Eager and Ashland Streets in Baltimore, Maryland. Based on the Sanborn maps included as Figure Number 1, the site contained predominately rowhomes from at least 1890 until their recent demolition.

The 7-story parking garage building is expected to consist of a concrete framed building. The preliminary column loads estimated for this project indicate that maximum compression loads of approximately 1200 kips (concrete) may be expected. Although the structural data is yet available, uplift loads of up to 1000 kips and shear loads of 150 kips are expected. A finished floor grade of EL +68 will require cuts of approximately 12-feet below the present ground surface at the south end of the project.

The project is located within the Atlantic Coastal Plain Physiographic Province. The Atlantic Coastal Plain Province is characterized by sequences of marine and terrestrial sedimentary deposits. In general, the Coastal Plain Province consists of an eastward-thickening wedge of gravels, sands, silts, and clays that have been deposited upon an eroded crystalline basement rock surface that slopes downward toward the east. Many depositional environments existed during the formation of the Coastal Plain. Glacially influenced marine transgressions and regressions, periods of erosion and deposition, fluvial processes, and structural deformations have all played a part in the evolution of the Coastal Plain. As a result of these varying processes, the presence, thickness, and lateral continuity of geologic formations are highly variable.

Based on our experience in the area and our subsurface investigation conducted for this study, the soils at this site can be divided into three strata as in increasing depth below ground surface: man-made fill and Potomac Group deposits of the Cretaceous age. These deposits lie above the underlying residual profile which is only slightly weathered. Disintegrated rock was encountered between elevation EL+10 to EL+20 in some test borings.

The geotechnical field investigation consisted of eight test borings, drilled in the proposed building area. Details of the field investigations are found in Appendix A. Subsurface profiles are included as Figure number 2.

A summary of each of the primary subsurface strata is described below.

4.1 MAN-PLACED FILL

Man-placed fill was encountered in the test borings to depths of 2 to 19-feet below the ground surface, and is typically 5 to 10-feet thick. The fill is variable and consisted of a silty to clayey sand, Lean Clay and contained gravel, bricks, concrete rubble, construction debris and cinders. This fill was likely placed during episodes of construction at this site, with most of the fill placed during the recent demolition of the rowhomes. Note, that no foundation walls or floor slabs were encountered but it is suspected that they are present below the site. The penetration resistance in the fill indicated a generally loose density, with SPT blowcounts ranging from 3 to 16 blows per foot (bpf).

4.2 POTOMAC GROUP DEPOSITS

Potomac Group soils were encountered below the man-placed fill in the test borings. These deposits range from dense poorly to well-graded sands to stiff lean clay and silt described as SP, SW, SM, to ML using the USCS system. These deposits were encountered to depths of the borings at depths of 60 to below 80-feet below the ground surface. SPT blowcounts ranged from 2 bpf to 100/2". Based on the soil classification and densities, we subdivided this deposit into an upper, less dense deposit and a lower, more granular and more compact deposit.

4.3 RESIDUAL SOIL AND BEDROCK

Bedrock was not encountered nor sampled during our subsurface investigation to depths of 80-feet. However, residual soil indicating the top of the saprolite profile and disintegrated rock, defined as residual material having an N value of 60 or more, was encountered at below EL 30-feet.

4.4 GROUNDWATER

Groundwater when observed in the borings during and after drilling was at depths of 20 to 30-feet below the ground surface. Groundwater levels will fluctuate due to seasonal changes, precipitation, and construction activity.

Based on the referenced test borings and laboratory test results, we have conducted geotechnical analyses for foundation design associated with the proposed project. The following summarizes our recommendations for foundation design for the P1 Parking Garage supported on drilled shafts.

5.1 FOUNDATION SUPPORT - DRILLED SHAFTS

Our findings indicate that straight-sided drilled shafts may be used to support the building loads. These shafts may be designed using both skin friction and end bearing as indicated in the following table.

Stratum	Top of Stratum Elevation	Ultimate Skin Friction	Ultimate End Bearing
Recent Fill and Upper Potomac	EL +68	1.0 ksf	N/A
Upper Potomac	EL +55	2.8 ksf	25 ksf
Lower Potomac/Residual	EL +40	3.5 ksf	40 ksf

In order to ensure that all shafts will be installed into the dense Potomac profile, a minimum shaft tip elevation of EL +20 should be used. In order to allow shaft lengths workable with local drilling equipment, it is recommended that a maximum shaft length of 90-feet be used and that the shaft diameters vary as required in six-inch increments.

We performed a preliminary lateral load analysis using the generalized soil profile and assumed shaft sizes. This analysis is included in Appendix B. We assumed a free head condition in our analysis using the computer program LPILE Version 4.0. A more complete analysis should be performed as the design progress.

The following table summarizes the results of our analysis.

Shaft Diameter (ft)	Shaft Cut-off (ft)	Shaft Length (ft)	Axial Compression (kips)	Lateral Load (kips)	Shaft Head Deflection (in)	Maximum Bending Moment (in-kip)
48	EL+68	60	1200	75	0.35	7574
				100	0.48	1.01E4
				150	0.76	1.54E4
54	EL+68	60	1200	75	0.28	8318
				100	0.38	1.10E4
				150	0.57	1.67E4

The minimum shaft diameter should be 36-inches. These shafts should be installed with drilling equipment meeting the following requirements:

Weight of Kelly Bar = 5,000 Pounds (Minimum)

Total Load Applied to Auger = 25,000 Pounds (Minimum)

Total Torque Applied to Auger = 80,000 ft-lbs (Minimum)

Drill augers should be equipped with a heavy-duty rock auger with a steel flight plate of not less than ½-inch thickness and equipped with carbide rock teeth. The shaft should be drilled to the depths required or refusal. Refusal is defined as using full crowd force until a penetration rate of less than one-inch per five-minutes is reached. Due to the presence of previous structures on this site, the possibility of encountering man-made obstructions exist. If the shaft refuses above the design tip elevation, the use of coring equipment will be required to penetrate these obstructions.

It is recommended that for compression loads, a Factor of Safety of at least 2.0 be applied to the above ultimate values to limit foundation settlements under design load to less than one-half inch. It is not necessary to add the weight of the concrete shaft to the building load in order to size the shaft for compression loads.

For uplift loads a minimum Factor of Safety of 2.5 should be applied to the skin friction ultimate loads given above. In addition, the weight of the shaft, using the effective weight of concrete, 85 pcf, can be subtracted from the design uplift load.

Draft specifications for use in drilled shafts installed is included in Appendix D.

The use of a reinforcing cage extending at least 20-feet or top 33 percent of the shaft which ever is greater is required to ensure shaft continuity through the upper fills .

After the shaft concrete has cured for at least 7 days, the first three shafts should have low-strain integrity testing performed in accordance with ASTM D-5882 to assess if the upper section of the shaft is free from defects. Additional integrity tests may be required if unusual drilling or breaks in the concrete placement occur.

All drilled shafts should be constructed according to good engineering practice. In drilling caissons, the upper portion of the earth walls shall be adequately and securely protected when necessary against cave-ins, displacement of the surrounding earth, and for the retention of groundwater by means of temporary steel cylinder liners or casings. If removable steel liners are used, they may be withdrawn as the concrete is being placed providing the bottom of the liner is kept at least three-feet below the top of the concrete. The concrete in all caissons shall be stopped at the cutoff elevations indicated on the contract drawings, within a tolerance of two-inches.

All drilled shaft installation shall be subjected to continuous construction review by an experienced drilled shaft inspector working under the direct supervision of a Registered Professional Engineer from our office. The inspector shall observe the entire operation of shaft excavation and concreting, shall verify the placement of any required reinforcing steel

or other special structural units, and shall verify the material throughout the shaft and at the bottom of each shaft by visual and manual inspection of the drill cuttings.

The inspector shall record all measurements pertaining to the shaft installations and note any unusual circumstances observed. At the end of each work day, he shall compile all figures for the day's work, make certain that the drilled shaft contractor and the general contractor agree with these figures, then fill out a daily log of these figures and distribute copies of this log to the architect, the structural engineer, the general contractor and the drilled shaft contractor, along with a copy to the Registered Professional Engineer in our office.

5.2 SHALLOW SPREAD FOOTINGS - LIGHTLY LOADED STRUCTURES

We expect that some lightly loaded structures (wall loads of less than 6 klf and column loads of less than 100 kips) founded at nominal depths below existing grade may be required at the site. These structures may include small site walls, equipment foundations, etc. These lightly loaded structures may be founded on spread footings. The Stratum A materials contained some construction debris and organics and may not have been placed in a controlled manner. Therefore, we believe that the Stratum A existing fill soils are not suitable for direct support of footings. Where the Stratum A fill soils or loose natural soils are encountered, the footings should be undercut to a minimum depth of 1B for square footings and 2B for strip footings, where B is equal to the footing width. The undercut excavation should be backfilled with new compacted fill. A design soil bearing pressure of 2.0 ksf is recommended for footings founded on new compacted fill when installed as described herein. Toe pressures for retaining walls should not exceed 3.0 ksf.

Undercutting of unsuitable existing fill soils should be expected where footings are founded near the existing ground surface. Unit rates and an allowance should be established for undercutting of unsuitable soil. The undercut and backfill should be performed in accordance with the recommendations in Section 5.4.

Strip footings should be at least 18-inches wide and column footings at least 30-inches for shear considerations. A maximum slope of 1.5H:1V should be maintained between the bottom edges of footings at different levels. Exterior footings and footings in unheated areas should be placed at least 2.5-feet below grade for frost protection.

Based on wall loads of less than 6 klf and column loads less than 100 kips, we estimate total settlements of approximately one-inch. Where spread footings are founded adjacent to below grade walls or within a slope of 1H:1V, the walls should be structurally evaluated for the ability to withstand the surcharge from the new footings.

5.3 FLOOR SLAB SUPPORT

Considering a lower floor at EL+68, the floor slab subgrades are expected to be placed on densified existing fill and newly placed compacted fill and firm natural soils. Prior to placement of the floor slabs, the suitability of the slab subgrades should be determined by proofrolling. Proofrolling should be performed using a loaded ten-ton dump truck (or equivalent heavy-construction equipment) under the observation of a geotechnical engineer

from our office. Any additional loose or unsuitable soils found during proofrolling should be removed and replaced with compacted fill. Slab areas should be dynamically surface compacted prior to foundation construction using a vibratory drum roller having a minimum static weight of 20 kips and a dynamic force of 40 kips. The roller should make a minimum of ten passes over each building area, five each in perpendicular directions. The rolling speed should be less than two-feet per second. This will produce a more uniformly dense layer, and should help to reduce differential settlements. The dynamic surface compaction should occur after removal of all existing foundations and slabs but prior to any fills being placed on the building area. The compaction should be carried to at least 10-feet horizontally beyond the building footprint.

Floor slabs may be designed using a modulus of subgrade reaction, k , equal to 90 pci. Perched groundwater is estimated to be about five-feet below proposed first floor grades, and a special underfloor subdrainage system is recommended as outlined in Section 5.5.

5.4 COMPACTED FILL REQUIREMENTS

Compacted structural fill should consist of soils classified SM or better in accordance with the Unified Soil Classification System, ASTM D-2487. Soils meeting this requirement are classified as SM, SC, SP, SW, GM, GC, GP, and GW. Soils used for compacted fill should be free of topsoil and other organics, rubble, rock larger than three-inches in diameter, and other deleterious matter. Compacted structural fill should be placed in approximately horizontal layers, each layer having a loose thickness of not more than eight-inches.

Depending on the time of year construction of the fills occur, it is likely that the fill soils may require either wetting or drying. All structural fill should be compacted to 95 percent of the maximum dry density in accordance with ASTM D-698, Standard Proctor. The suitability of fill materials should be verified during construction by a geotechnical engineer from our office.

Compacted structural fill should be placed in approximately horizontal layers, each layer having a loose thickness of not more than eight-inches. Compacted fill should be placed on subgrades which have first been stripped of existing slabs, foundations and soft areas. Proofrolling with a loaded 20-ton truck will delineate soft zones which should be removed prior to fill placement. Fill subgrades consisting of existing fill should be dynamically compacted per Section 5.3.

The moisture content of the fill soils should be no higher than about 3 percent above or below the optimum moisture content of the soil at the time of placement. The suitability of fill materials should be verified in the field. In-place compaction of the soils should be tested on a full-time basis during construction by a representative from our office. Moisture conditioning, such as wetting or drying, should be expected to be required depending upon the time of year construction occurs.

5.5 SUBDRAINAGE

The test borings indicate that the groundwater table is approximately 10-feet below the finished lower floor elevation and an underfloor subdrainage system does not appear

necessary. A vertical drainage system should be installed against all below grade walls to avoid hydrostatic build-up of water pressure. The drainage system should be pumped into storm drains, if allowed.

5.5.1 Vertical Drainage Behind Below Grade Walls

Surface water infiltrating the ground surface adjacent to below grade walls, may collect against the walls in the low to moderate permeability on-site soils. Drainage materials should be placed outside of the below grade walls to prevent hydrostatic water pressures due to the collection of water behind the walls. Accordingly, we recommend installation of vertical permeable drainage panels outside of the below grade walls. These panels should be placed against the walls and covered with a geotextile to prevent infiltration of fines. The drainage panels should have a minimum flow rate of four-gallons per minute per foot at a hydraulic gradient of 0.1 in accordance with ASTM D-4716. The geotextile fabric over the panels should meet the requirements as described in the previous section and shown on Figure Number 3.

The vertical drainage material should be continuous along the below grade walls. The water collected by the vertical drainage should drain to a perimeter drain at the base of the walls as shown on Figure Number 3. Basement walls should be waterproofed.

With the subdrainage system recommended herein, attention to details of construction and proper inspection by qualified personnel should be insisted upon. A plan should be prepared to indicate the entire system, location of clean-outs, invert grades, sump pits, pumps and standby pumps for disposal of collected groundwater.

A minimum 6-mil thick polyethylene plastic layer should be placed above the subdrainage layer prior to pouring the floor slab to prevent contamination of the drainage layer by the poured concrete.

5.5.2 General

The design and construction of any subdrainage system is not completely foolproof, and local inoperation of the system may occur due to various causes. Full-time inspection of the waterproofing and subdrainage system should be performed.

The before mentioned recommendations are intended to assist the design professionals in the general design of a subdrainage system for the project. If substantially different groundwater flow quantities are encountered in the construction of if the lowest floor levels are changed, we should be informed so that we may determine any effect on our conclusions and recommendations give herein.

5.6 LATERAL EARTH PRESSURES

Due to the proposed grades, below grade building walls will be required. Building walls and any other below grade walls should be designed to resist lateral earth pressures developed from the soil behind the walls and any surcharge loads at the top of the wall.

The building below grade walls are expected to be up to 10-feet deep. Recommended pressure diagrams for design of semi-rigid below grade walls (walls which are restrained at the top) are included as Figure Number 4A. An average equivalent fluid pressure of 46 (psf) is recommended for design of the below grade walls.

A recommended pressure diagram for design of cantilevered retaining walls or other walls that are not fixed at the top (walls that allow active earth pressures to develop) is included on Figure Number 4B. An average equivalent active fluid pressure of 38H (psf) and an ultimate passive pressure of 350H (psf) is recommended for design of cantilevered walls with level backfill. If slopes are planned behind or in front of the walls, we should be notified so that we can revise our recommendations, if required. A Factor of Safety of at least 1.5 should be used for evaluation of overturning and sliding of cantilevered walls.

Compacted backfill behind and in front of the walls should consist of and be constructed to the same requirements as described in Section 5.4. Compaction equipment exceeding 3,000 pounds in dead weight should not be used closer than the height of the walls in order to avoid overloading the walls. All below grade walls should be braced prior to backfilling.

These walls need not be designed for hydrostatic water pressure if the subdrainage system is installed in accordance with section 5.5 and as shown on Figure Number 3. The drainage panels detailed on the figures should have a minimum flow rate of four-gallons per minute per foot at a hydraulic gradient of 0.1 per ASTM D4716. The panels should be covered with a geotextile as specified on the figures. The panels should be continuous over the back of the wall and extend from the drainage pipe to two-feet below the ground surface. The basement walls should be waterproofed. Ponding of precipitation behind the walls should be avoided during construction as the pressure diagrams herein do not include hydrostatic pressures.

5.7 EXCAVATION SUPPORT

The building excavation will be up to 12-feet below grade, and it will be necessary to install temporary excavation support in some locations. If the cut slope is steeper than 1V:2H near adjacent structures, property lines and existing utility lines a temporary excavation support system is recommended. We expect excavation support will be required along the south, East and West building walls. Where excavation support is needed, we recommend that a free-draining soldier beam and wood lagging wall is appropriate.

The soldier beam and lagging should be designed for an equivalent earth pressure of 38H where H is the height of the wall. Due to the proximity of existing utilities and dense soil conditions, we recommend that the piles be preaugered to minimize vibrations adjacent to the city utilities. Soldier pile spacing should be a maximum of eight-feet, and the wood lagging should not be less than three-inches thick, unfinished. The excavation support system should be designed by a registered professional engineer.

Due to the possible presence of perched water and the granular soils at the site, we expect that the loss of soil may occur between the lagging. The contractor should incorporate measures to prevent loss of soil through the lagging. These measures may include stuffing the lagging with geotextile or straw.

A precondition survey of adjacent buildings, utilities, and structures should be performed prior to the start of work. The precondition survey should document the condition of the adjacent buildings/structures prior to construction and possibly identify areas to be monitored during construction.

5.8 IBC 2000 SEISMIC SITE COEFFICIENTS

Seismic design parameters were determined using the 2000 International Building Code. The ICBO software named "Code Central" provides Earthquake Spectral Response Acceleration Maps. Following are the mapped site coefficient values for the project site at Zip Code 21205.

Seismic Site Spectral Response Accelerations Mapped Values for Soil Factors of 1.0		
Description	Period (Sec)	SA
Short Period Spectral Response Acceleration Ss	0.2	0.198g
1 Second Spectral Response Acceleration S1	1.0	0.064g

Based on the results of subsurface exploration and the in-situ measurement of the in-situ shear wave velocity, Appendix F, the site soil is defined as Site Class C per Table 1615.1.1. For this defined class with the above indicated mapped spectral acceleration values, the following are the Site Coefficient values per Table 1615.1 and Table 1615.2.

Site Class and Characteristic and Site Coefficients	
Site Class	C
Soil Profile	Stiff Soil Profile
Site Coefficient (Fa)	1.20
Site Coefficient (Fv)	1.70
0.2 Second Maximum Spectral Response Acceleration (Sms)	0.239 g
1.0 Second Maximum Spectral Response Acceleration (Sm1)	0.109 g
0.2 Second Design Spectral Response Acceleration (Sds)	0.159 g
1.0 Second Design Spectral Response Acceleration (Sd1)	0.073 g

Complete results of Spectral Acceleration with varying period is given in Appendix E along with the seismic shear wave characteristics in Appendix F.

5.9 UTILITY TRENCH BACKFILL

The on-site existing fill soils are generally suitable for use as backfill subject to environmental limitation. Removal of the on-site soils and the recompaction of backfill material for use in utility trench areas will be required. All utility trenches deeper than four-feet should be sloped 1.5H:1V. Sheet piling and shoring may be used in deep trenches. The following parameters may be used for the design of temporary earth retaining structures that are above the water table:

Unit weight of the Soil = 115 pci
Internal Friction Angle = 28 degrees

Continuous dewatering may be required in deep trenches. All structures below the perched water table should be designed for water pressure. In addition, at least six-inches of stone or compacted granular material should be placed under all utility lines to provide uniform support for the lines.

Specific recommendations for foundation construction are given below:

1. The drilled shaft contractor should submit installation procedures including concrete placement methods.
2. Full-time monitoring of drilling of the shaft to confirm the soil profile.
3. Cleaning of shaft bottom test prior to concrete placement using a cleanout bucket to ensure that all loose material is removed.
4. Low strain integrity testing of the initial three shafts should be performed after concrete has partially cured for at least seven days.
5. Excavation support specifications should be prepared by the design team. This specification should include maximum permissible horizontal movements of support wall and discuss required monitoring program to be used during construction.
6. Provisions should be made for obstructions that may be encountered during site excavations and foundation installations. These are expected to include existing foundation walls and floor slabs.

It is recommended that observation and monitoring be provided during the foundation construction by a geotechnical engineer or experienced soils technician who is familiar with the subsurface conditions and the foundation design criteria. These services should include the observation and documentation of the installation methods, the reinforcing steel and concrete installation and testing. Additionally, it is recommended that a drilled shaft specification, specific for this project, be included in the construction contract documents. A recommended draft of this specification is included as Appendix D.

This report has been prepared to assist Forest City Commercial Group in the foundation design for the P1 Parking Garage on N . Wolfe Street in Baltimore, Maryland. The work was carried out in accordance with reasonable and accepted engineering practices. No warranty or guarantee, either written or implied, is applicable to this work. The recommendations presented in this report are based upon the assumption that the subsurface conditions do not deviate appreciably from those disclosed by the subsurface exploration, and that competent monitoring and testing will be conducted during construction. Any changes in the proposed design of the facilities or variations in the existing site conditions from those assumed in this report must be brought to the attention of D.W. Kozera, Inc. so that we have the opportunity to review the changes, and if necessary, modify the recommendations to suit the new conditions.

Soil samples obtained during the course of the investigation will be retained at our facility for a period of three months. After that time, the samples will be discarded unless other arrangements are made by your office.

FIGURE NUMBER 1

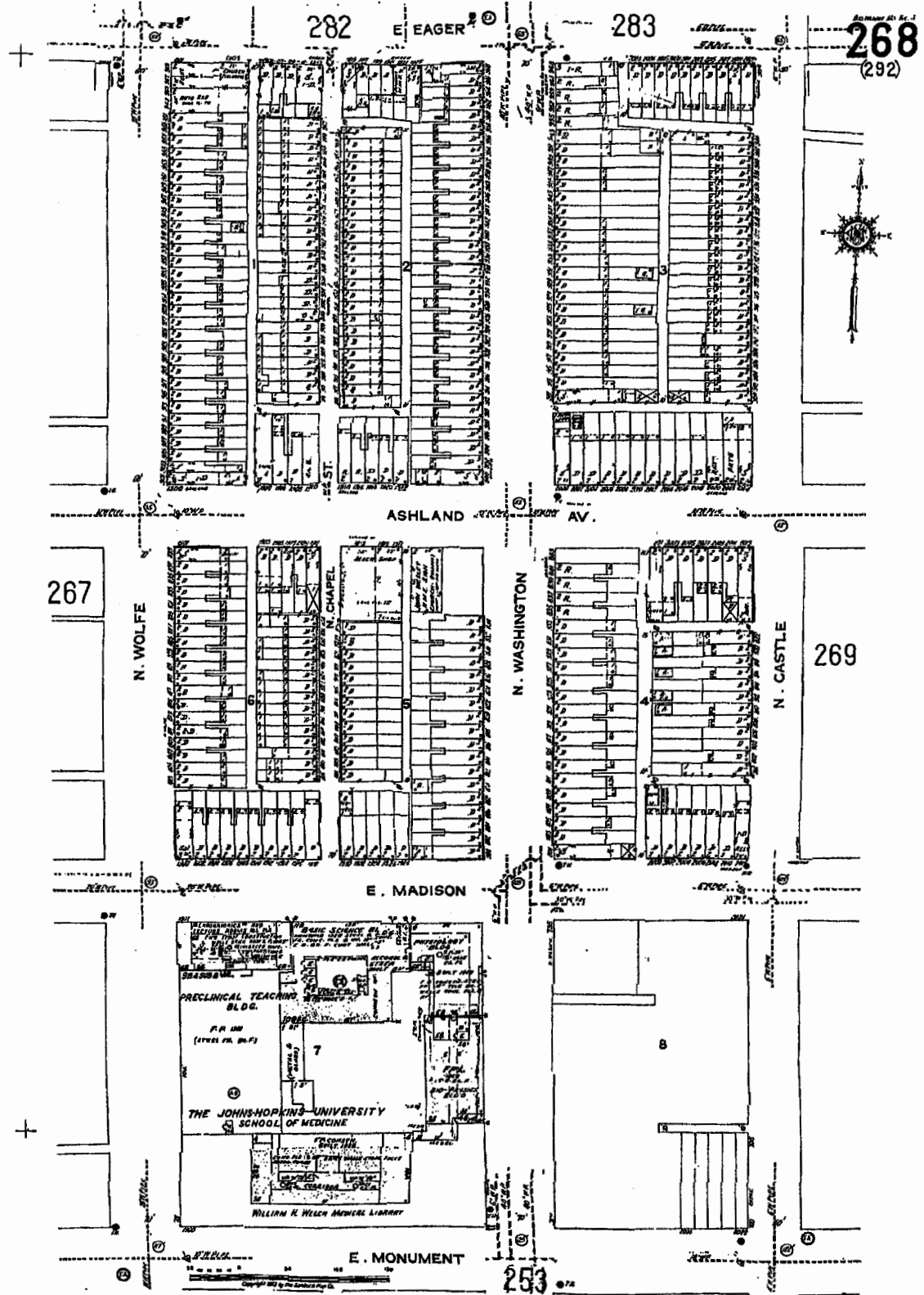
Sanborn Maps

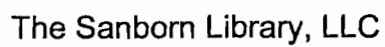


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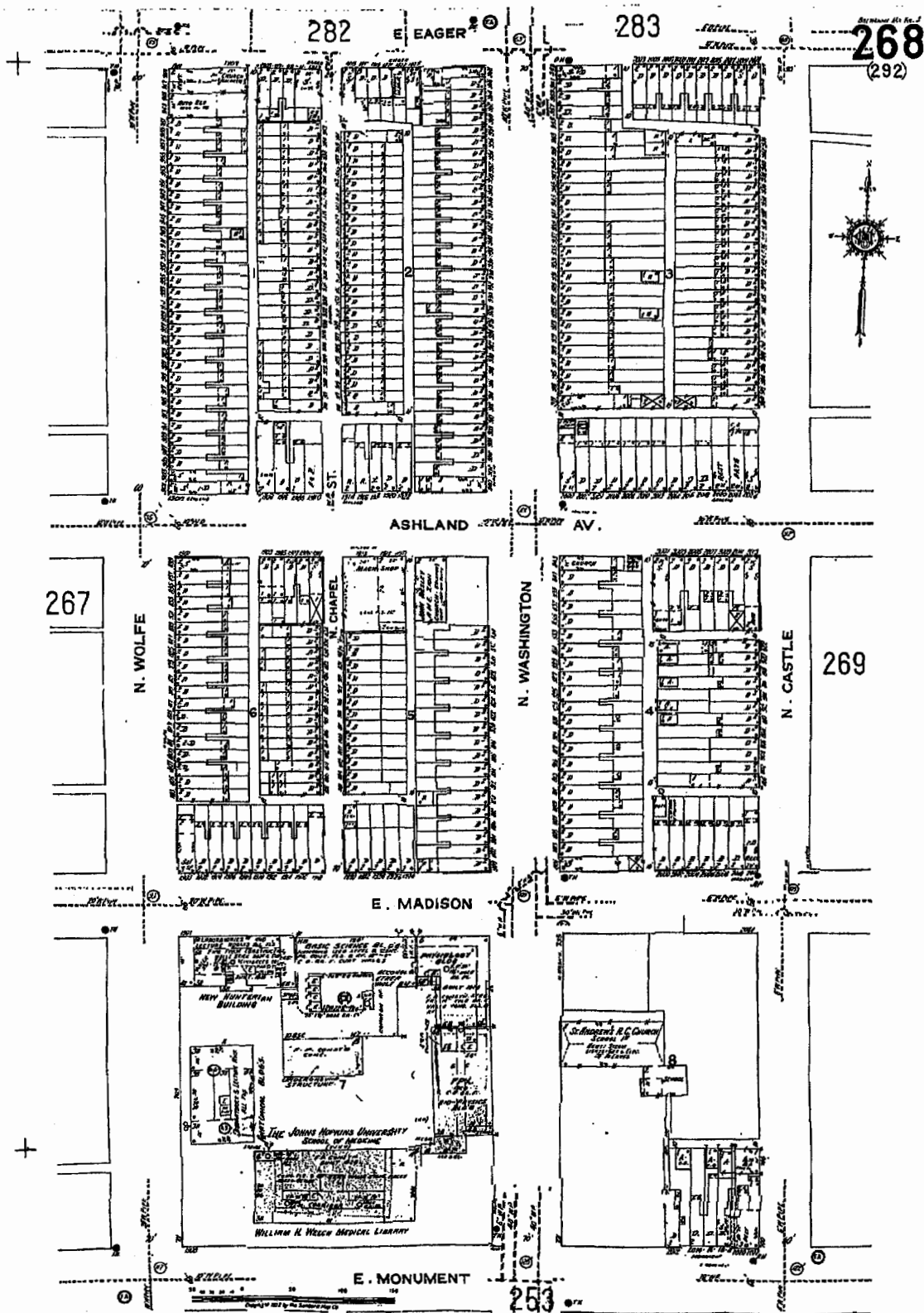
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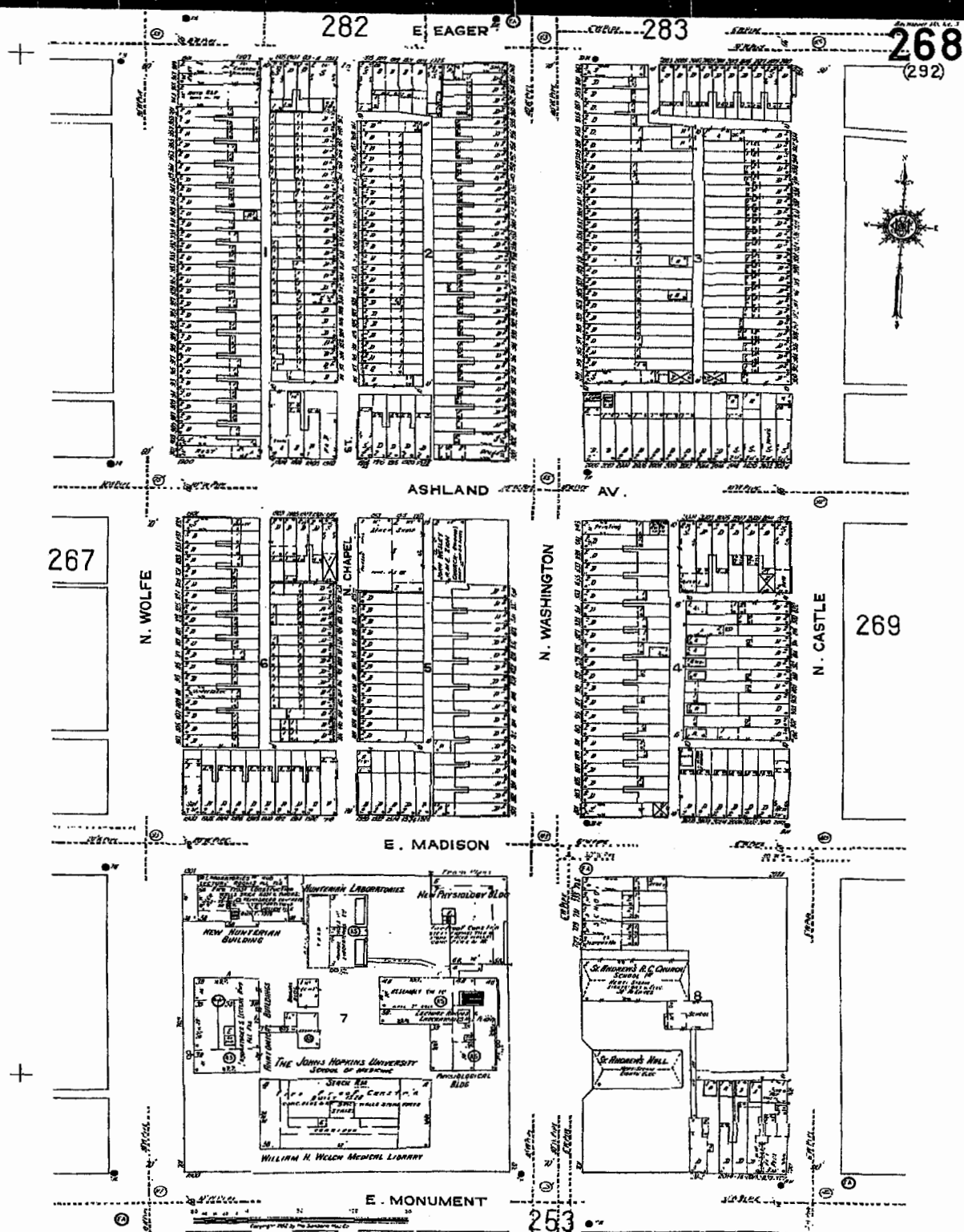




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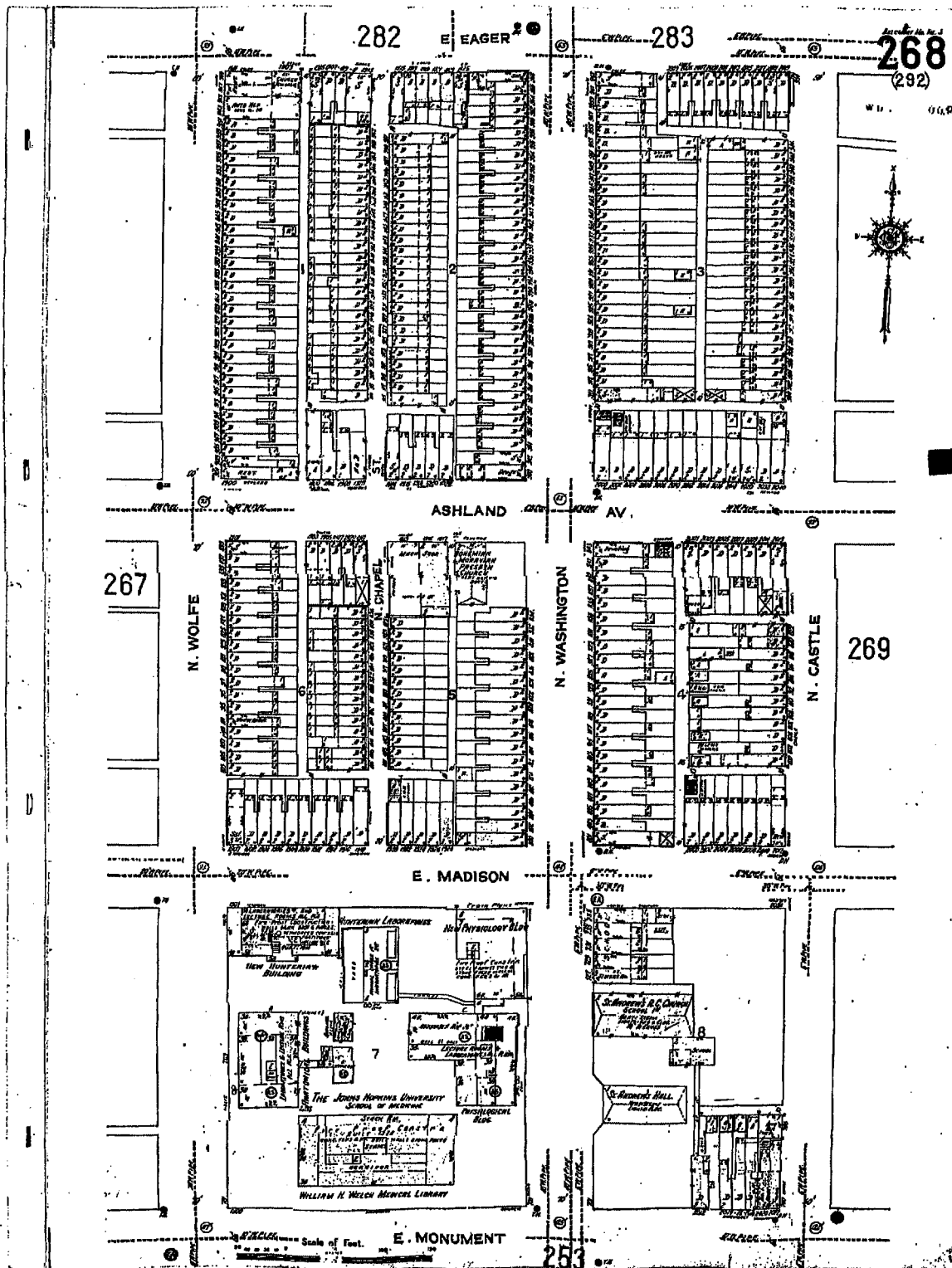




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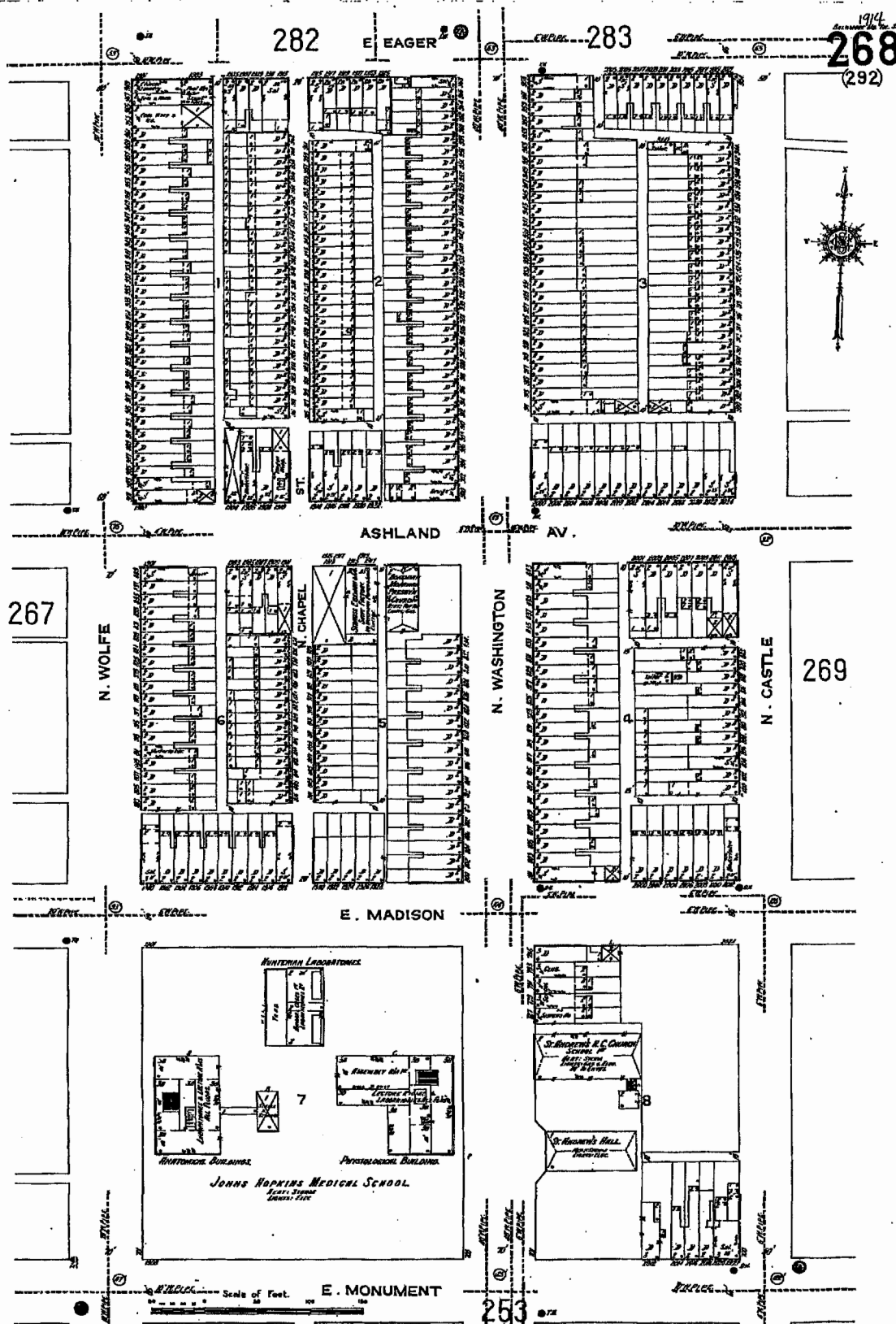




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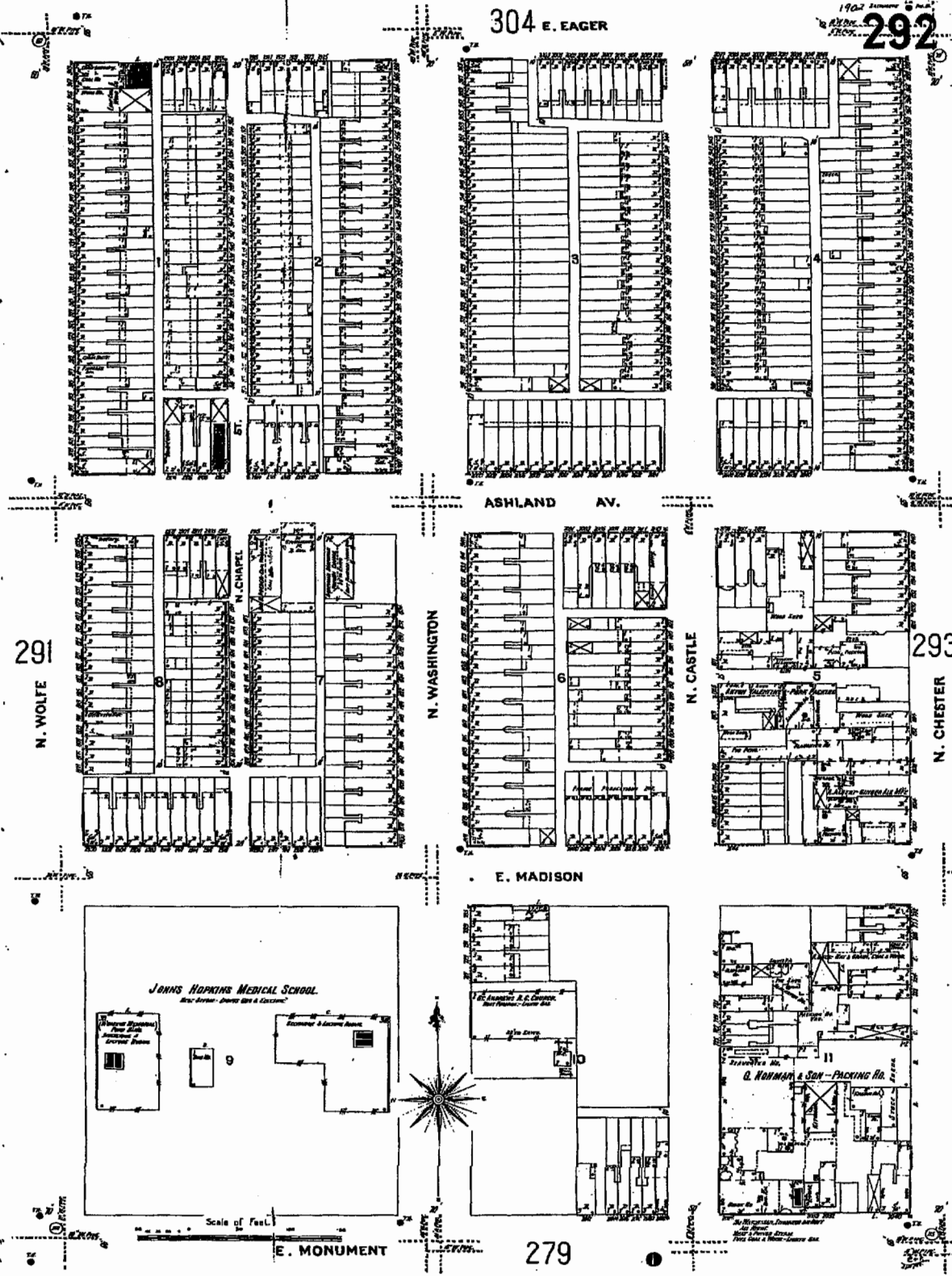




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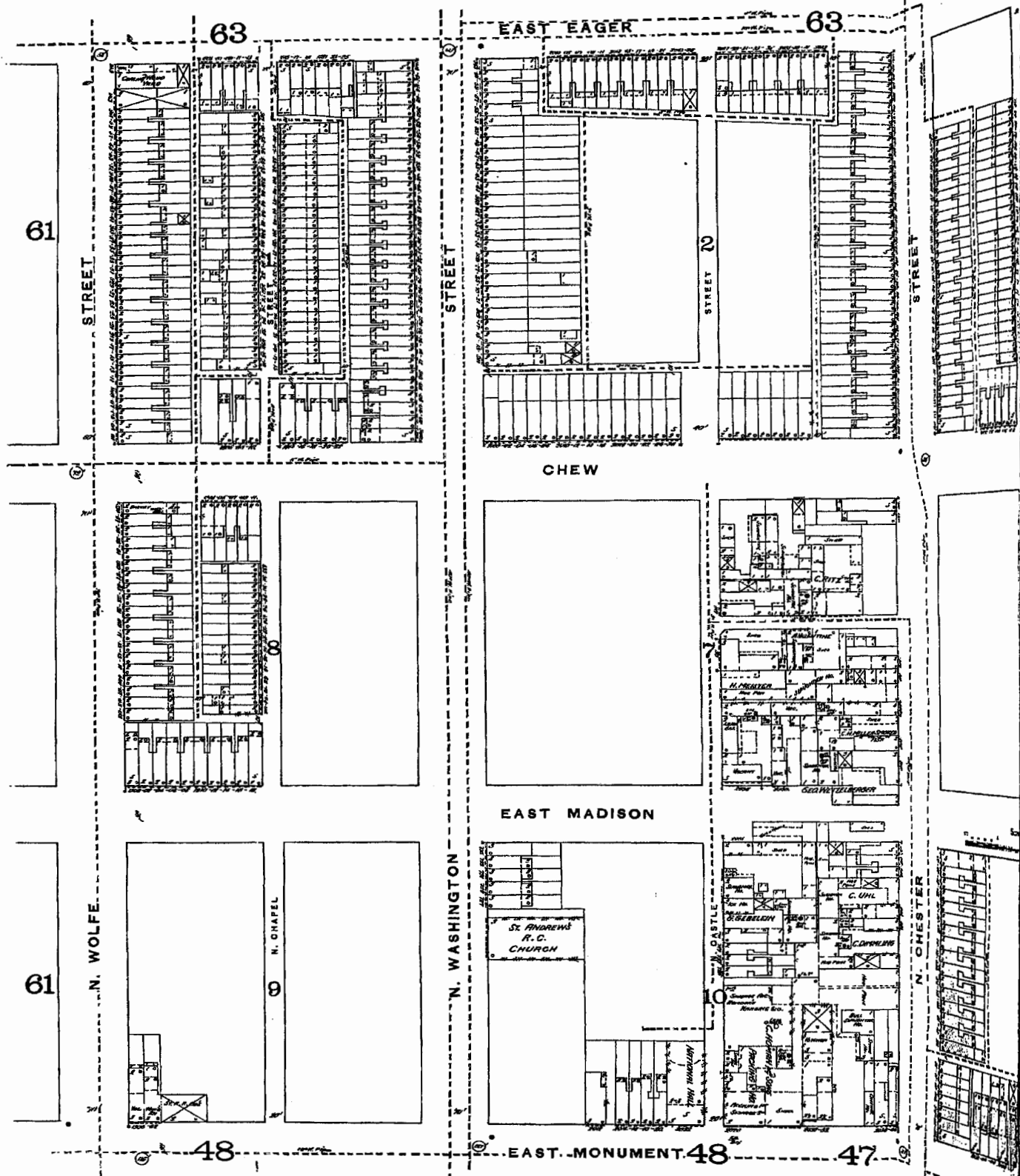
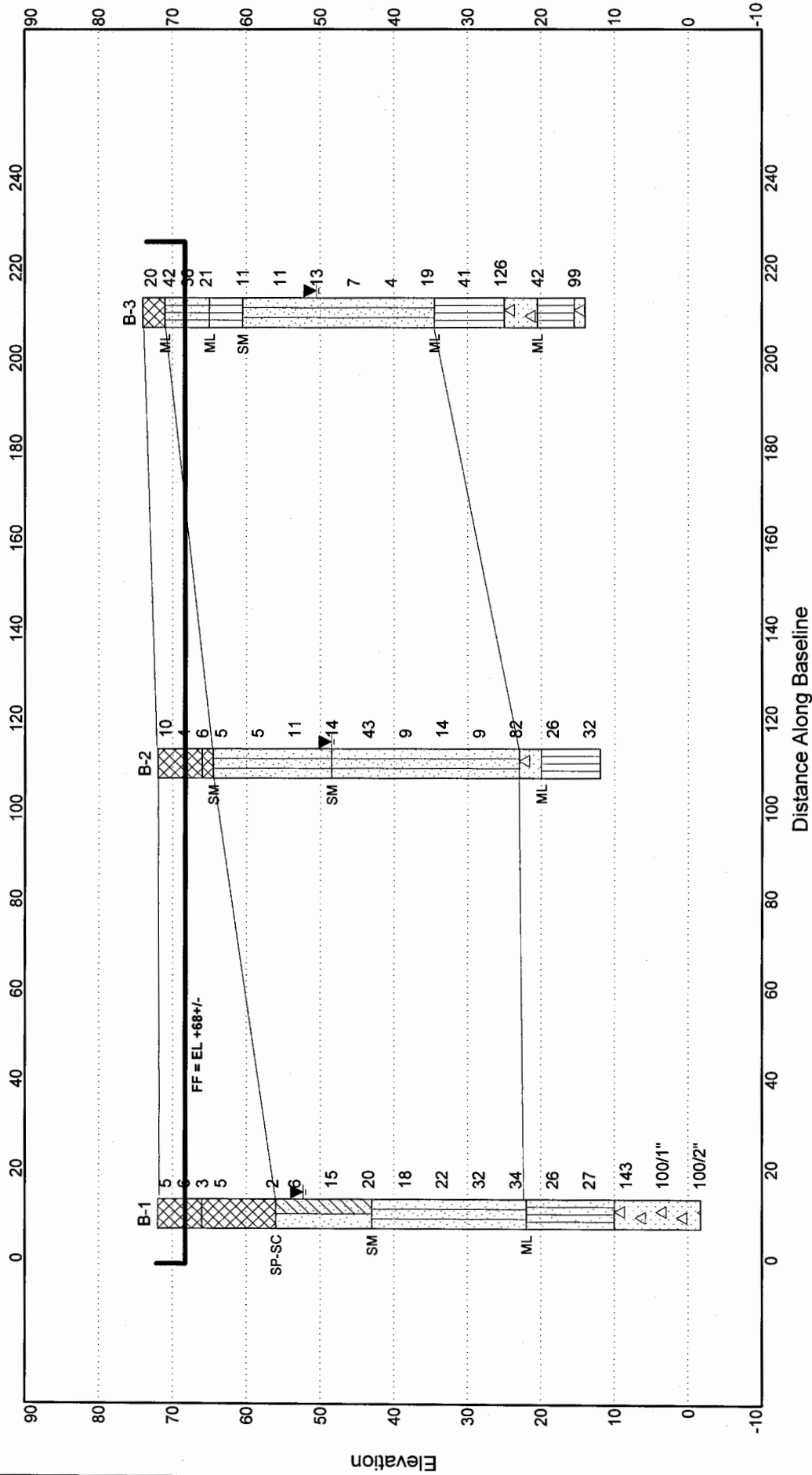


FIGURE NUMBER 2

Subsurface Profiles

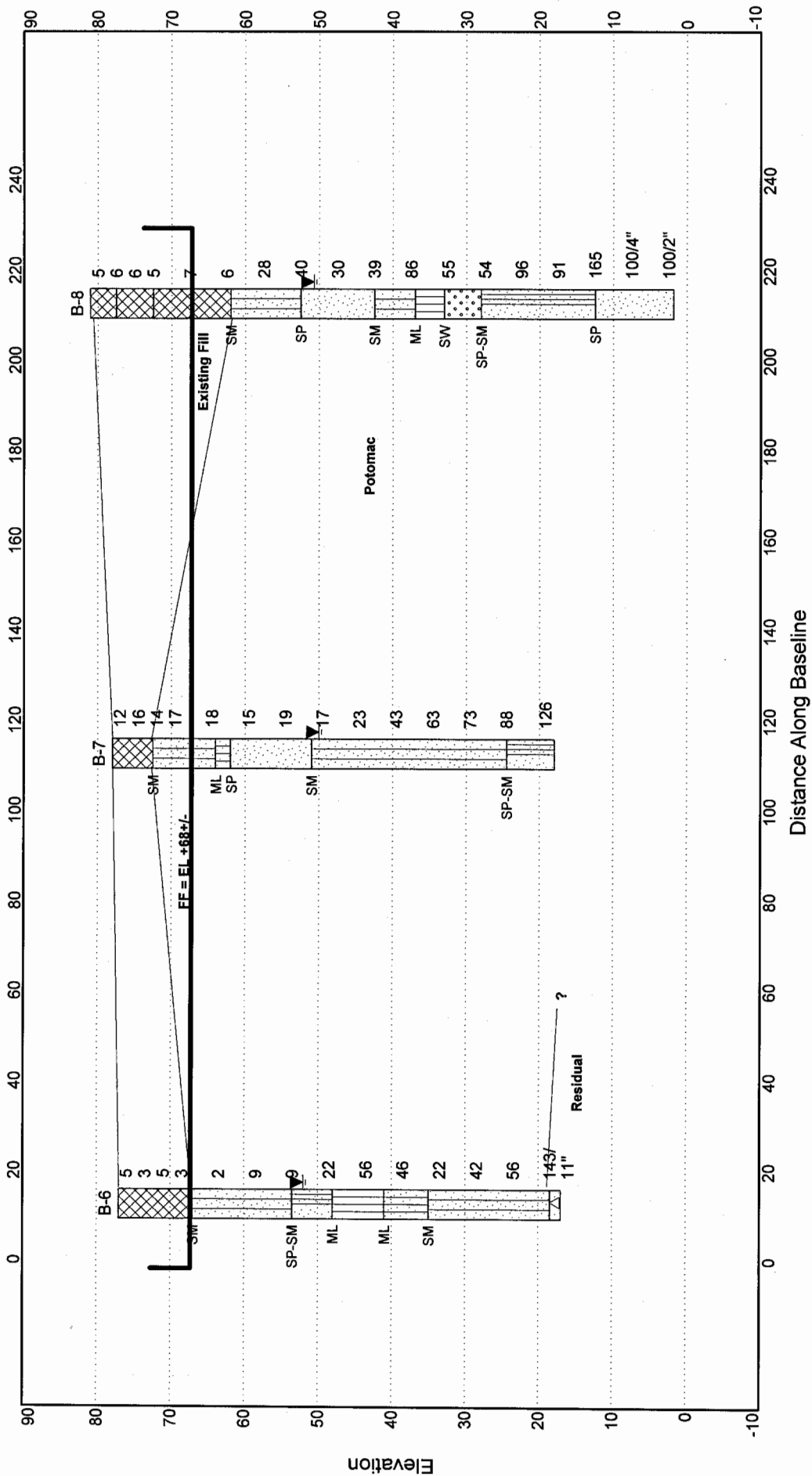


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Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

SUBSURFACE PROFILE
A-A

East Baltimore Development
P-1 Parking Garage

Contract No.	Date	Drawing No.
05176.D	Mar 06	1



Baltimore, Maryland

PROFESSIONAL ENGINEERS & GEOLOGISTS

SUBSURFACE PROFILE

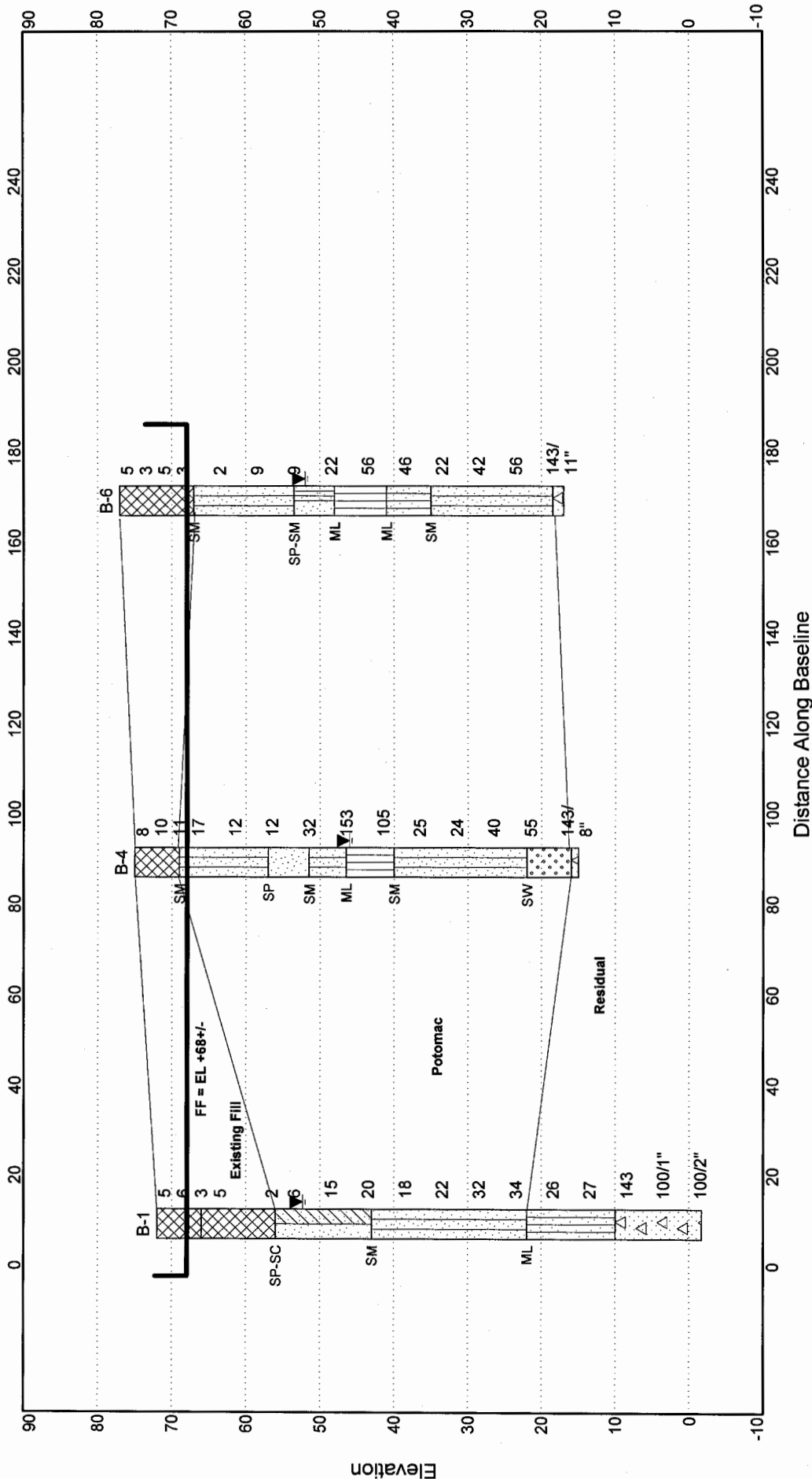
B-B

**East Baltimore Development
P-1 Parking Garage**

Contract No.
05176.D

Date	Mar 06
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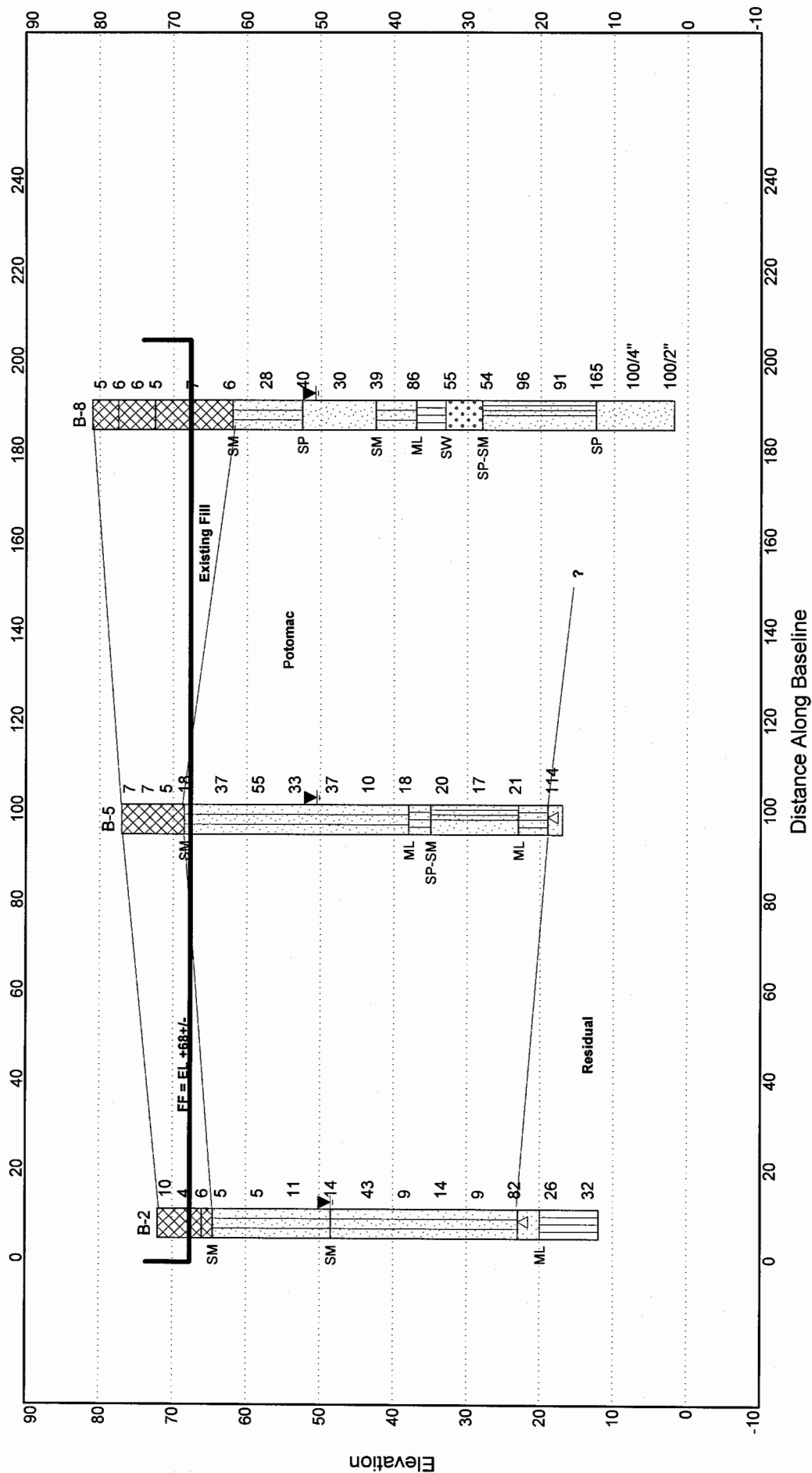
Drawing No. 1



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Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

SUBSURFACE PROFILE
C-C

East Baltimore Development P-1 Parking Garage		Contract No. 05176.D	Date Mar 06	Drawing No. 1
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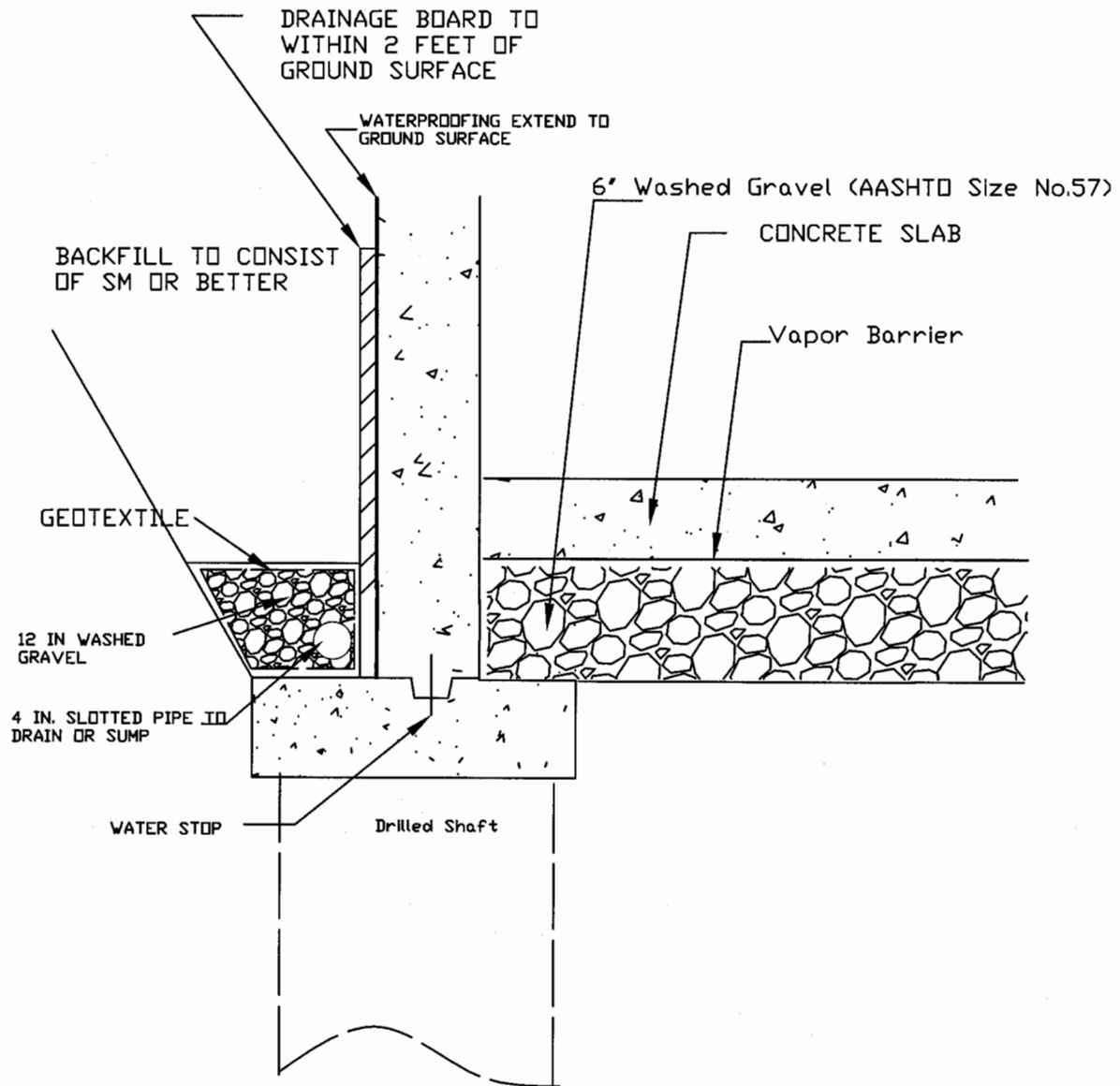


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FIGURE NUMBER 3

Typical Subdrainage Requirements



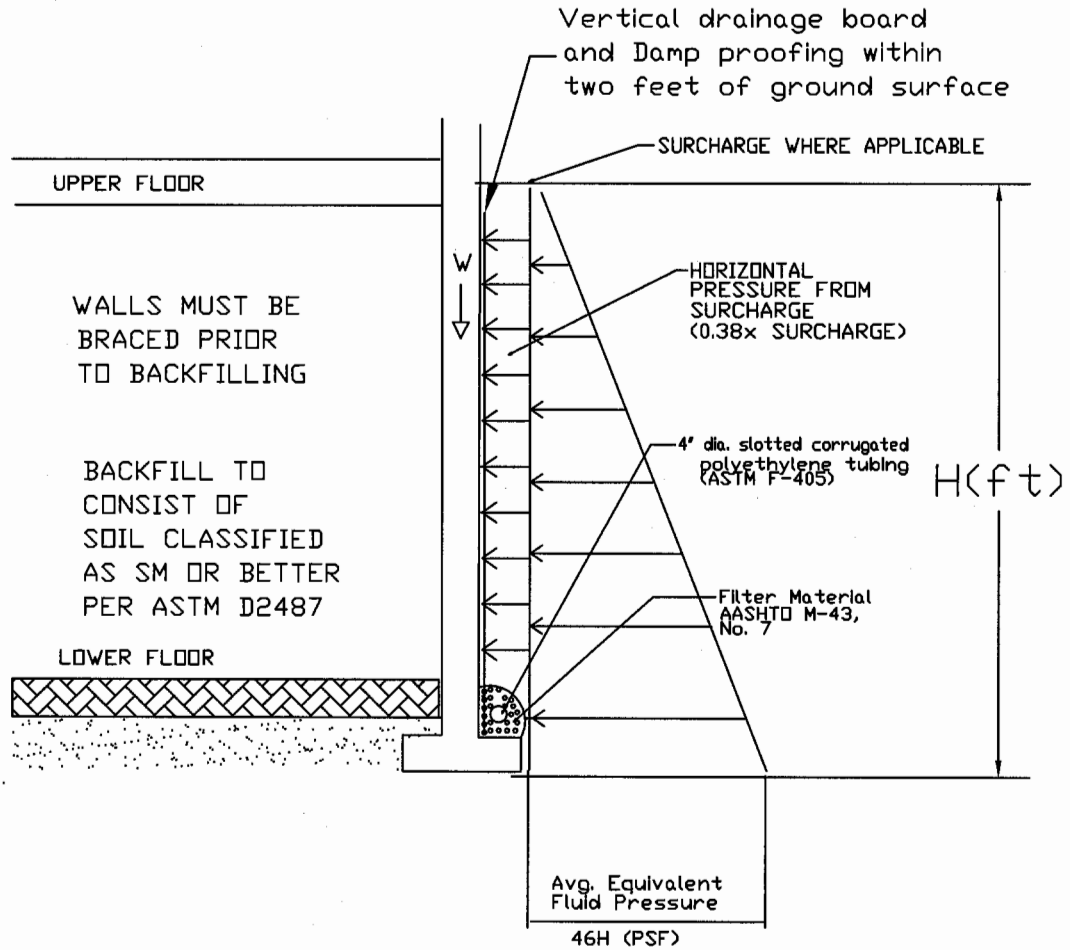
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 1408 BARE HILLS RD. BALTIMORE, MD 21209
 PH. 410.823.1060 FAX. 410.823.1062

TYPICAL SUB-DRAINAGE DETAIL

EAST BALTIMORE DEVELOPMENT PHASE-I PARKING GARAGE	
CONTRACT No	05176.D
DATE:	MARCH 15, 2006
FIGURE NO	3

FIGURE NUMBER 4

Lateral Earth Pressure Diagrams



BASEMENT WALLS WITH RESTRAINED HEAD CONDITION

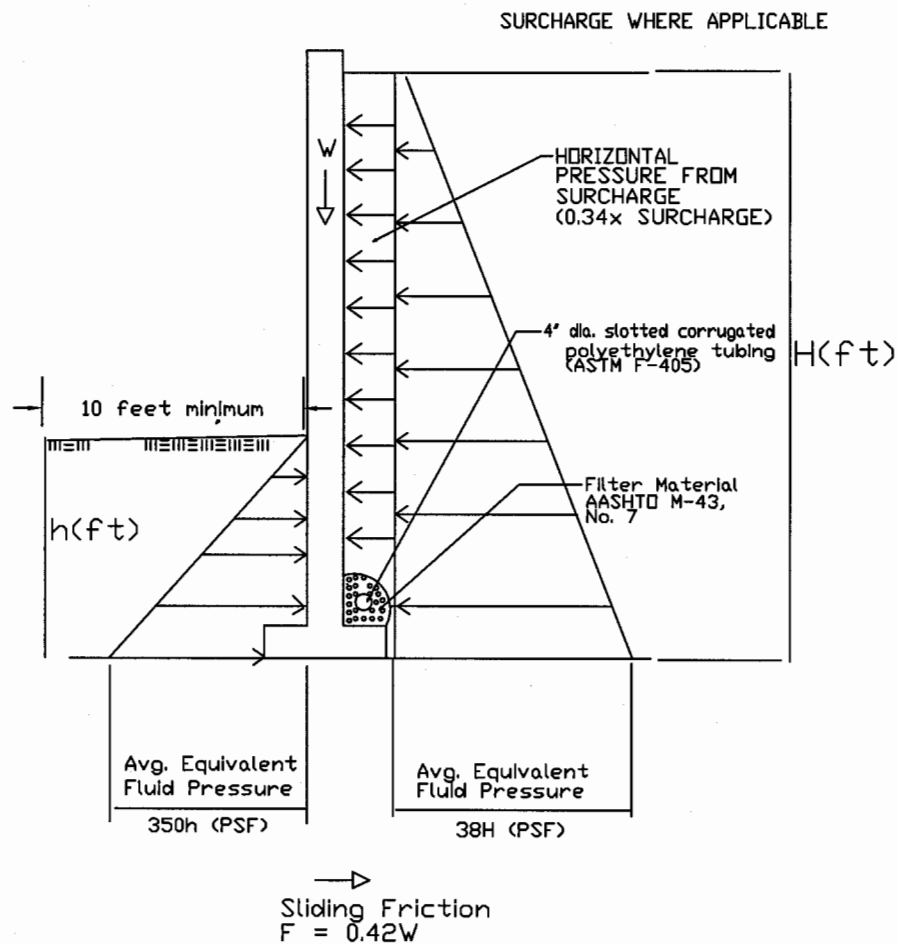


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LATERAL EARTH PRESSURE DIAGRAM BASEMENT WALL

EAST BALTIMORE DEVELOPMENT
PHASE-I PARKING GARAGE, BALTIMORE MD

CONTRACT NO	05176.D
DATE:	MARCH 14, 2006
FIGURE NO	4A



BACKFILL TO CONSIST OF SOIL CLASSIFIED
ML OR BETTER PER ASTM D2487

WALL MUST BE BRACED PRIOR TO BACKFILLING



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LATERAL EARTH PRESSURE DIAGRAM
RETAINING WALL

EAST BALTIMORE DEVELOPMENT
P-1 PARKING GARAGE, BALTIMORE

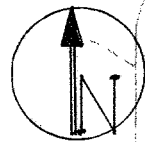
CONTRACT NO 05176.2D

DATE: MAR 15, 2006

FIGURE NO 4B

APPENDIX A

Test Boring Logs



E. EAGER STREET

N. WOLF ST

N. WASHINGTON ST

CITADEL ST

FISHLAND AVE.

R-8

B-1

B-2

B-3

B-4

B-5

B-6

B-7

B-8



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TEST BORING LOCATION PLAN

⊕ Test Boring Location

EAST BALTIMORE DEVELOPMENT
P-1 PARKING GARAGE

CONTRACT NUMBER	05176.D
DATE	03/15/2005
FIGURE NUMBER	APX-A



D. W. KOZERA, INC.
Baltimore, Maryland

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING

TEST BORING LOG

Boring No.: B-1
Contract No.: 05176.D
Page: 1 of 1

Project: East Baltimore Development
Location: P-1 Parking Garage
Baltimore, Maryland

Ground Surf. El. (±): 72.0
Date Started: 2-1-06
Date Completed: 2-1-06
Contractor: EBA Engineering, Inc.
Driller: Ed
Rig:
Drill Method: 3 1/4" HSA
Inspector: A. Zmoda

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	2-1	00:00	23.5	23.5	---
Completion	2-1	12:01	---	---	---
Casing Pulled	2-1	12:02	19.2	---	25.0
	2-3	00:00	19.7	---	21.0

Depth (ft)	Surf. Elev. 72.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0											
70		1	4-2-3	5				Clay FILL with Sand and Gravel, wet, red and brown		A	Topsoil = 0.5'
5		2	3-3-3	6							
65		3	2-2-1	3				Clayey Sand FILL, moist, orange brown	Fill		
10		4	1-2-3	5				do; with Silt FILL layer at 8.5'			
60											
15		5	1-1-1	2				POORLY GRADED SAND with Clay, wet, orange brown		B	
55		6	2-2-4	6			SP				
20							SC	do; tan, white with Silt lenses at 23.5'			
50		7	6-7-8	15							
25											
45		8	8-10-10	20				SILTY SAND, wet, white	Potomac		
30											
40		9	8-9-9	18							
35											
35		10	10-9-13	22			SM				
40											
30		11	12-16-16	32							
45											
25		12	16-17-17	34				do; trace Gravel at 48.5'			
50								SANDY SILT, moist, gray		C	
20		13	11-13-13	26			ML				
55											
15		14	12-14-13	27				do; green at 58.8'			
60											
10		15	32-63-80	143				DISINTEGRATED ROCK, moist, olive green	Residual	D	
65											
5		16	55-100/7"	100/1"							
70											
0		17	100/2"	100/2"				do; dark green at 73.5'			
								Bottom of boring at 73.7'			



D. W. KOZERA, INC.
Baltimore, Maryland

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING

TEST BORING LOG

Boring No.: B-2
Contract No.: 05176.D
Page: 1 of 1

Project: East Baltimore Development
Location: P-1 Parking Garage
Baltimore, Maryland

Ground Surf. El. (±): 72.0
Date Started : 2-7-06
Date Completed : 2-7-06
Contractor : EBA Engineering, Inc.
Driller : Ed
Rig :
Drill Method : 3 1/4" HSA
Inspector : A. Zmoda

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	2-7	00:00	23.5	23.5	---
Completion	2-7	12:01	---	---	---
Casing Pulled	2-7	12:02	None	---	20.0
	2-8	00:00	None	---	20.2

Depth (ft)	Surf. Elev. 72.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0											
70		1	6-6-4	10				Sandy Silt FILL, moist, brown and white	Fill	A	Crushed Stone = 0.5'
5		2	3-2-2	4				do; tan at 3.5'			
65		3	3-3-3	6				Cinders FILL, dry, black	Potomac	B	
10		4	2-2-3	5				SILTY SAND, moist, tan			
60							SM	do; moist, yellow, tan at 13.5'			
15		5	3-3-2	5				do; tan at 18.5'			
55		6	5-6-5	11				SILTY SAND, wet, red brown			
20		7	8-7-7	14				do; medium brown at 28.5'			
45		8	12-22-21	43				do; light gray with red brown lenses at 33.5'	Residual	D	
30		9	8-3-6	9			SM	do; trace gravel at 38.5'		C	
40		10	7-7-7	14				do; red brown and light gray at 43.5'			
35		11	3-3-6	9				DISINTEGRATED ROCK, dry, red brown			
50		12	20-40-42	82				SILT, moist, gray green			
20		13	9-9-17	26			ML	do; olive green, with Sand at 58.5'			
55		14	9-13-19	32				Bottom of boring at 60.0'			
15											
60											



D. W. KOZERA, INC.
Baltimore, Maryland

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING

TEST BORING LOG

Boring No.: B-3
Contract No.: 05176.D
Page: 1 of 1

Project: East Baltimore Development
Location: P-1 Parking Garage
Baltimore, Maryland

Ground Surf. El. (±): 74.0
Date Started: 2-6-06
Date Completed: 2-6-06
Contractor: EBA Engineering, Inc.
Driller: Ed
Rig:
Drill Method: 3 1/4" HSA
Inspector: A. Zmoda

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	2-6	00:00	23.5	23.5	---
Completion	2-6	12:01	---	---	---
Casing Pulled	2-6	12:02	Dry	---	21.0

Depth (ft)	Surf. Elev. 74.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0		1	9-13-7	20				Silty Sand FILL with Gravel and brick, moist, brown	Fill	A	Topsoil = 0.0"
5	70	2	9-19-23	42				SANDY SILT, moist, brown		B	
		3	12-20-146	36			ML				
10	65	4	9-10-11	21			ML	SILT with Sand, moist, white			
15	60	5	4-5-6	11				SILTY SAND, moist, tan			
20	55	6	3-4-7	11							
25	50	7	8-7-6	13			SM	do; with cemented sand lense, wet, red, brown at 23.5'	Potomac		
30	45	8	4-4-3	7				do; tan at 28.5'			
35	40	9	4-2-2	4							
40	35	10	2-10-9	19				SILT with Sand, moist, white		C	
45	30	11	11-19-22	41			ML	do; light blue gray at 43.5'			
50	25	12	10-54-72	126				DISINTEGRATED ROCK, moist, olive green	Residual	D	
55	20	13	28-18-24	42			ML	SILT, moist, olive green		C	
60	15	14	25-32-67	99				DISINTEGRATED ROCK, moist, olive green Bottom of boring at 60.0'		D	



D. W. KOZERA, INC.
Baltimore, Maryland

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING

TEST BORING LOG

Boring No.: **B-4**
Contract No.: **05176.D**
Page: **1 of 1**

Project: **East Baltimore Development**
Location: **P-1 Parking Garage**
Baltimore, Maryland

Ground Surf. El. (±): **75.0**
Date Started : **2-8-06**
Date Completed : **2-9-06**
Contractor : **EBA Engineering, Inc.**
Driller : **Ed**
Rig :
Drill Method : **3 1/4" HSA**
Inspector : **A. Zmoda**

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	2-8	00:00	37.0	---	38.5
Completion	2-8	12:01	---	---	---
Casing Pulled	2-9	00:00	26.9	---	39.9
	2-9	12:01	29.0	---	30.4

Depth (ft)	Surf. Elev. 75.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	75	1	5-5-3	8				Silty Sand FILL, moist, tan	Fill	A	Topsoil = 0.5'
5	70	2	2-3-7	10				do; with Silt and Clay layers at 3.5'			
		3	3-6-5	11				SILTY SAND, moist, white		B	
10	65	4	0-8-9	17							
		5	4-5-7	12			SM	do; tan at 13.5'			
15	60	6	4-6-6	12			SP	POORLY GRADED SAND, moist, tan			
20	55	7	13-15-17	32			SM	SILTY SAND, moist, tan			
25	50	8	27-60-93	153			ML	SILT, trace Sand, moist, white	Potomac		
30	45	9	35-45-60	105				do; with Silty Sand layers at 33.5'			
35	40	10	7-14-11	25				SILTY SAND, wet, white			
40	35	11	11-12-12	24			SM	do; with red brown layers at 43.5'			
45	30	12	13-20-20	40				do; white at 48.5'			
50	25	13	35-35-20	55			SW	WELL GRADED SAND with Gravel, wet, tan			
55	20	14	27-43-100/2"	143/8"				DISINTEGRATED ROCK, moist, tan and white Bottom of boring at 60.0'	Residual	D	



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GEOTECHNICAL & ENVIRONMENTAL ENGINEERING

TEST BORING LOG

Boring No.: B-5
Contract No.: 05176.D
Page: 1 of 1

Project: East Baltimore Development
Location: P-1 Parking Garage
Baltimore, Maryland

Ground Surf. El. (±): 77.0
Date Started: 2-6-06
Date Completed: 2-6-06
Contractor: EBA Engineering, Inc.
Driller: Ed
Rig:
Drill Method: 3 1/4" HSA
Inspector: A. Zmoda

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	2-6	00:00	27.5	28.5	---
Completion	2-6	12:01	---	---	---
Casing Pulled	2-6	12:02	26.5	---	33.0

Depth (ft)	Surf. Elev. 77.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0								Sandy Silt FILL, moist, red brown, tan		A	Topsoil = 0.2'
75		1	4-4-3	7					Fill		
5		2	2-3-4	7							
70		3	2-3-2	5				do; with construction debris at 7.0'			
10		4	2-5-13	18				SILTY SAND, moist, white		B	
65											
15		5	11-18-19	37							
60											
20		6	13-25-30	55				do; tan-yellow at 18.5'			
55											
25		7	10-13-20	33			SM				
50								do; red brown, wet at 27.0'			
30		8	11-16-21	37							
45											
35		9	2-4-6	10				do; tan at 33.5'			
40											
35		10	4-8-10	18			ML	SANDY SILT, wet, white			
45											
30		11	6-11-9	20				POORLY GRADED SAND with Silt and Gravel, wet, tan			
50							SP SM				
25		12	7-8-9	17							
55											
20		13	7-9-12	21			ML	SANDY SILT, wet, brown			
60											
		14	75-42-72	114				DISINTEGRATED ROCK, moist, tan and white Bottom of boring at 60.0'	Residual	D	



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Baltimore, Maryland

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING

TEST BORING LOG

Boring No.: B-6
Contract No.: 05176.D
Page: 1 of 1

Project: East Baltimore Development
Location: P-1 Parking Garage
Baltimore, Maryland

Ground Surf. El. (±): 77.0
Date Started: 2-2-06
Date Completed: 2-3-06
Contractor: EBA Engineering, Inc.
Driller: Ed
Rig:
Drill Method: 3 1/4" HSA
Inspector: A. Zmoda

	GROUNDWATER OBSERVATIONS				
	Date	Time	Depth	Casing	Caved
Encountered	2-2	00:00	37.0	33.5	---
Completion	2-2	12:01	---	---	---
Casing Pulled	2-3	00:00	25.0	---	31.3

Depth (ft)	Surf. Elev. 77.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0								Sandy Silt FILL, moist, white and tan	Fill	A	Topsoil = 0.3'
75		1	2-2-3	5				contains brick and concrete rubble at 3.5'			
5		2	2-2-1	3							
70		3	2-3-2	5							
10		4	2-1-2	3					Potomac	B	
65								SILTY SAND with Sand layers, moist, white and tan			
15		5	2-1-1	2			SM				
20		6	6-4-5	9							
55											
25		7	6-5-4	9	▼		SP SM	POORLY GRADED SAND with Silt, moist, red, brown			
50											
30		8	6-11-11	22			ML	SILT, trace Sand, moist, white			
45											
35		9	14-26-30	56							
40					▽						
40		10	15-21-25	46			ML	SANDY SILT, moist, white			
35											
45		11	9-10-12	22				SILTY SAND, wet, white	Residual	D	
30											
50		12	9-16-26	42			SM	do; with red brown layers at 48.5'			
25											
55		13	16-24-32	56					Residual		
20											
60		14	42-43-100/5"	143/11"				DISINTEGRATED ROCK with ironite, moist, tan to brown Bottom of boring at 60.0'			



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GEOTECHNICAL & ENVIRONMENTAL ENGINEERING

TEST BORING LOG

Boring No.: B-7
Contract No.: 05176.D
Page: 1 of 1

Project: East Baltimore Development
Location: P-1 Parking Garage
Baltimore, Maryland

Ground Surf. El. (±): 78.0
Date Started: 2-8-06
Date Completed: 2-9-06
Contractor: EBA Engineering, Inc.
Driller: Ed
Rig:
Drill Method: 3 1/4" HSA
Inspector: A. Zmoda

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	2-8	00:00	29.0	28.5	---
Completion	2-8	12:01	---	---	---
Casing Pulled	2-8	12:02	28.7	---	29.3
	2-9	00:00	28.0	---	29.1

Depth (ft)	Surf. Elev. 78.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0								Sandy Silt FILL, moist, brown and gray	Fill	A	Topsoil = 0.4'
75		1	3-4-8	12				concrete rubble, dry, white at 3.5'			
5		2	8-8-8	16				SILTY SAND, moist, white		B	
70		3	7-7-7	14				do; with tan lenses at 8.5'			
10		4	4-9-8	17			SM				
65		5	4-8-10	18			ML	SANDY SILT, moist, white			
15								POORLY GRADED SAND, moist, yellow tan			
60		6	7-7-8	15			SP				
20								do; red brown with Sandy Silt layers at 23.5'			
55		7	8-9-10	19				SILTY SAND, wet, tan			
25											
50		8	5-10-7	17							
30											
45		9	7-9-14	23							
35											
40		10	18-21-22	43			SM				
35											
45		11	17-25-38	63							
50											
55		12	18-26-47	73							
25											
55		13	35-40-48	88			SP SM	POORLY GRADED SAND with Silt, moist, white			
20											
60		14	42-55-71	126				Bottom of boring at 60.0'			



D. W. KOZERA, INC.
Baltimore, Maryland

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING

TEST BORING LOG

Boring No.: **B-8**
Contract No.: **05176.D**
Page: **1 of 1**

Project: **East Baltimore Development**
Location: **P-1 Parking Garage**
Baltimore, Maryland

Ground Surf. El. (±) : **81.0**
Date Started : **2-3-06**
Date Completed : **2-3-06**
Contractor : **EBA Engineering, Inc.**
Driller : **Ed**
Rig :
Drill Method : **3 1/4" HSA**
Inspector : **A. Zmoda**

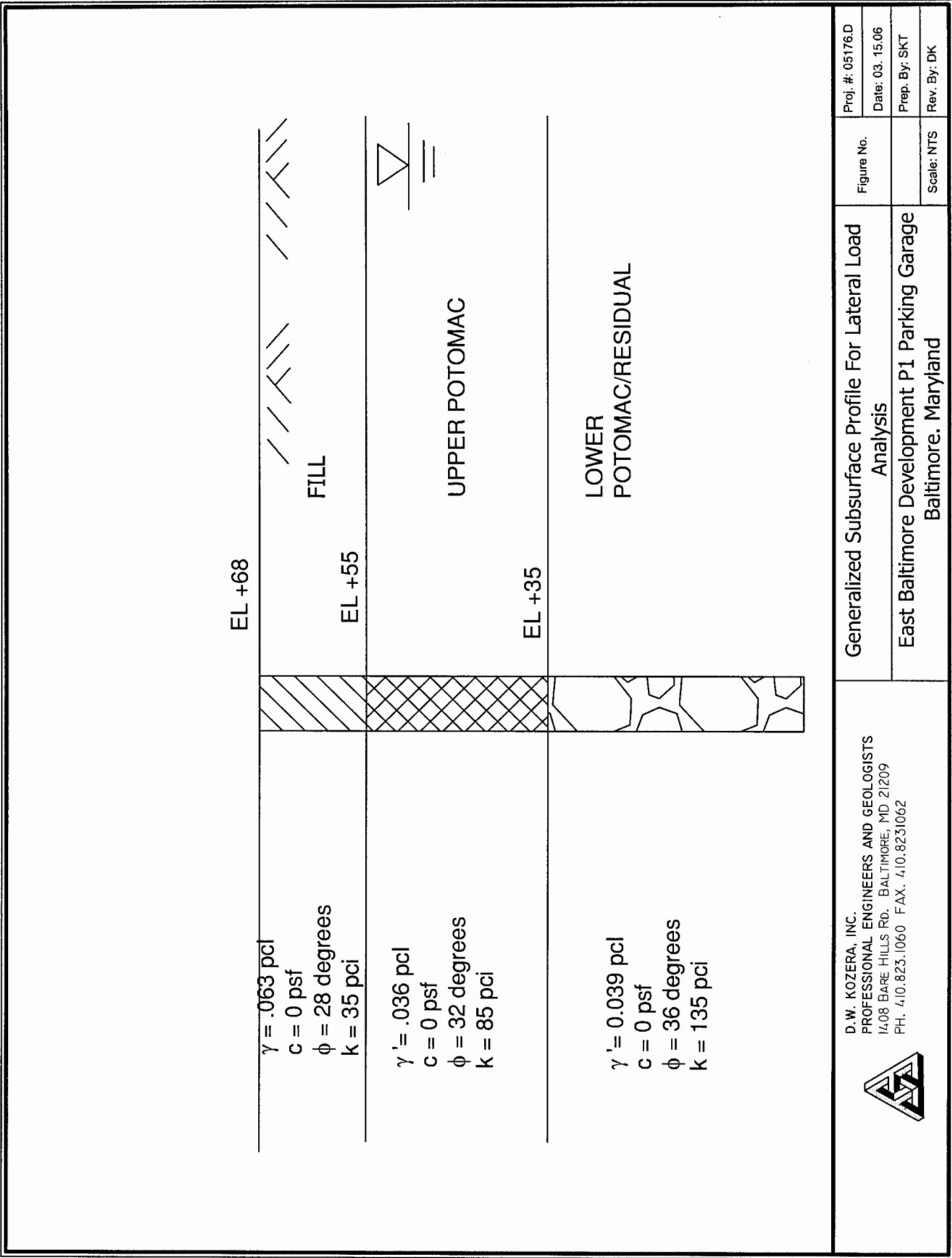
GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	2-3	00:00	33.5	33.4	---
Completion	2-3	12:01	---	---	---
Casing Pulled	2-3	12:02	31.6	---	33.6
	2-6	00:00	30.3	---	32.3

Depth (ft)	Surf. Elev. 81.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	80	1	4-2-3	5				Silty Sand FILL, moist, medium brown	Fill	A	Topsoil = 0.5'
5	75	2	3-3-3	6				do; rubble at 3.0'			
		3	2-3-3	6				Clay FILL with Sand layers, moist, red, brown			
10	70	4	2-2-3	5				Silt FILL, moist, multicolor			
15	65	5	2-3-4	7					Potomac	B	
20	60	6	3-2-4	6				SILTY SAND, moist, white			
25	55	7	11-13-15	28			SM	do; tan at 23.5'			
30	50	8	13-20-20	40				POORLY GRADED SAND, moist, tan			
35	45	9	13-17-13	30			SP				
40	40	10	9-20-19	39			SM	SILTY SAND, trace Gravel, wet, red brown			
45	35	11	23-36-50	86			ML	SILT with Sand, moist, light gray			
50	30	12	20-25-30	55			SW	WELL GRADED SAND, trace Gravel, wet, red tan			
55	25	13	32-22-32	54				POORLY GRADED SAND with Silt and Gravel, wet, tan			
60	20	14	40-40-56	96			SP SM				
65	15	15	25-36-55	91							
70	10	16	45-65-100	165				POORLY GRADED SAND, wet, tan			
75	5	17	85/100/4"	100/4"			SP				
		18	92-100/2"	100/2"				do; with gravel at 78.5' Bottom of boring at 79.2'			

APPENDIX B

Lateral Load Analysis



=====

LPILE Plus for Windows, Version 4.0 (4.0.8)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

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=====

This program is licensed to:

WS
S

Path to file locations: C:\Program Files\Ensoft\LpileP4\
Name of input data file: 05176.1pd
Name of output file: 05176.1po
Name of plot output file: 05176.1pp
Name of runtime file: 05176.1pr

Time and Date of Analysis

Date: March 14, 2006 Time: 14:25: 2

Problem Title

East Baltimore P1- Parking

Program Options

Units Used in Computations - US Customary Units, inches, pounds

Basic Program Options:

Analysis Type 1:

- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:

- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum bending moment, and shear force only
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:

- Number of pile increments = 100

05176.lpo

- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:

- Only summary tables of pile-head deflection, maximum bending moment, and maximum shear force are to be printed in output file.

Pile Structural Properties and Geometry

Pile Length = 600.00 in
Depth of ground surface below top of pile = .00 in
Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	48.000	260576.2000	1809.5000	3000000.000
2	600.0000	48.000	260576.2000	1809.5000	3000000.000

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = .000 in
Distance from top of pile to bottom of layer = 156.000 in
p-y subgrade modulus k for top of soil layer = 35.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 35.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 156.000 in
Distance from top of pile to bottom of layer = 396.000 in
p-y subgrade modulus k for top of soil layer = 85.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 85.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 396.000 in
Distance from top of pile to bottom of layer = 900.000 in
p-y subgrade modulus k for top of soil layer = 135.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 135.000 lbs/in**3

(Depth of lowest layer extends 300.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth
is defined using 6 points

Point	Depth X	Eff. Unit Weight
-------	---------	------------------

No.	in	lbs/in**3
1	.00	.06300
2	156.00	.06300
3	156.00	.03600
4	396.00	.03600
5	396.00	.03900
6	900.00	.03900

Shear Strength of Soils

Distribution of shear strength parameters with depth
defined using 6 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	.000	.00000	28.00	-----	-----
2	156.000	.00000	28.00	-----	-----
3	156.000	.00000	32.00	-----	-----
4	396.000	.00000	32.00	-----	-----
5	396.000	.00000	36.00	-----	-----
6	900.000	.00000	36.00	-----	-----

Notes:

- (1) Cohesion = uniaxial compressive strength for rock materials.
- (2) Values of E50 are reported for clay strata.
- (3) Default values will be generated for E50 when input values are 0.
- (4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 4

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)

Shear force at pile head = 75000.000 lbs

Bending moment at pile head = .000 in-lbs

Axial load at pile head = 1200000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 2

05176.lpo

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 100000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 1200000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 3

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 150000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 1200000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 4

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 200000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 1200000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 75000.000 lbs
Specified bending moment at pile head = .000 in-lbs
Specified axial load at pile head = 1200000.000 lbs

(Zero moment for this load indicates free-head conditions)

Output Verification:

Computed forces and moments are within specified convergence limits.

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 100000.000 lbs
Specified bending moment at pile head = .000 in-lbs
Specified axial load at pile head = 1200000.000 lbs

(Zero moment for this load indicates free-head conditions)

Output Verification:

Computed forces and moments are within specified convergence limits.

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 3

Pile-head boundary conditions are Shear and Moment (BC Type 1)
 Specified shear force at pile head = 150000.000 lbs
 Specified bending moment at pile head = .000 in-lbs
 Specified axial load at pile head = 1200000.000 lbs

(Zero moment for this load indicates free-head conditions)

Output Verification:

Computed forces and moments are within specified convergence limits.

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 4

Pile-head boundary conditions are Shear and Moment (BC Type 1)
 Specified shear force at pile head = 200000.000 lbs
 Specified bending moment at pile head = .000 in-lbs
 Specified axial load at pile head = 1200000.000 lbs

(Zero moment for this load indicates free-head conditions)

Output Verification:

Computed forces and moments are within specified convergence limits.

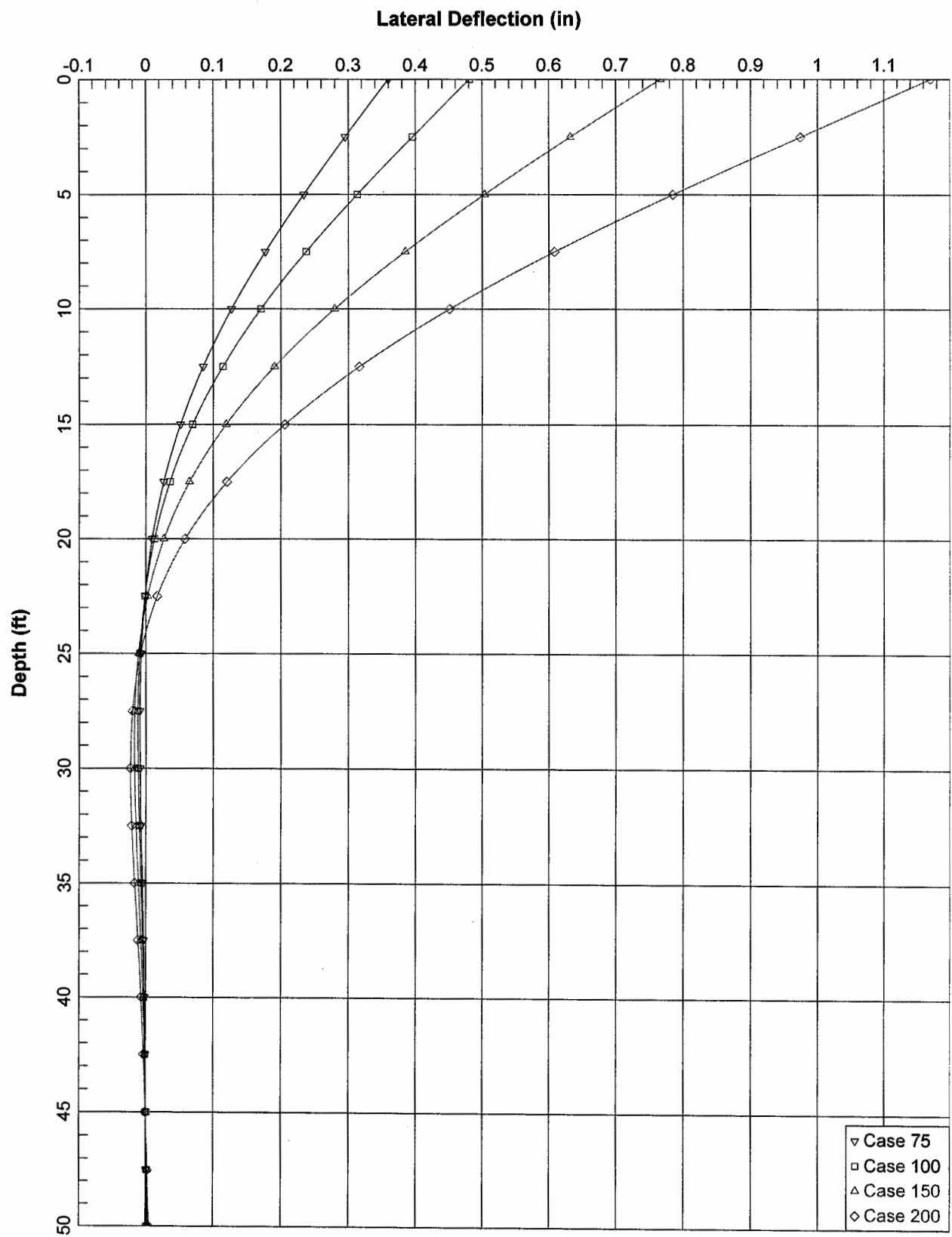
Summary of Pile-head Response

Definition of symbols for pile-head boundary conditions:

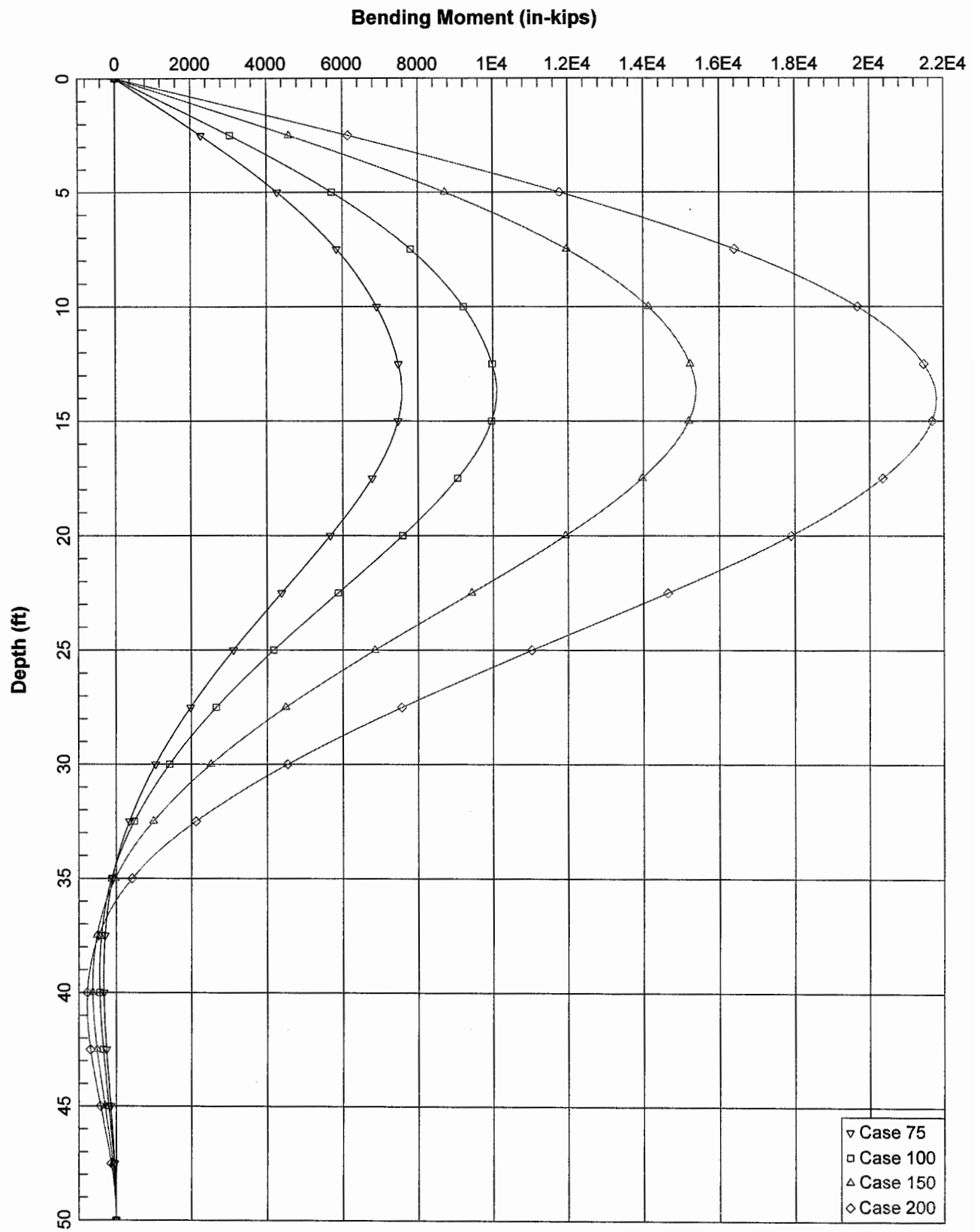
y = pile-head displacement, in
 M = pile-head moment, lbs-in
 V = pile-head shear force, lbs
 S = pile-head slope, radians
 R = rotational stiffness of pile-head, in-lbs/rad

BC Type	Boundary Condition 1	Boundary Condition 2	Axial Load lbs	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 75000.000	M= 0.000	1.200E+06	.3595	7.574E+06	75000.0000
1	V=100000.000	M= 0.000	1.200E+06	.4812	1.010E+07	100000.0000
1	V= 1.50E+05	M= 0.000	1.200E+06	.7663	1.539E+07	150000.0000
1	V= 2.00E+05	M= 0.000	1.200E+06	1.1709	2.181E+07	200000.0000

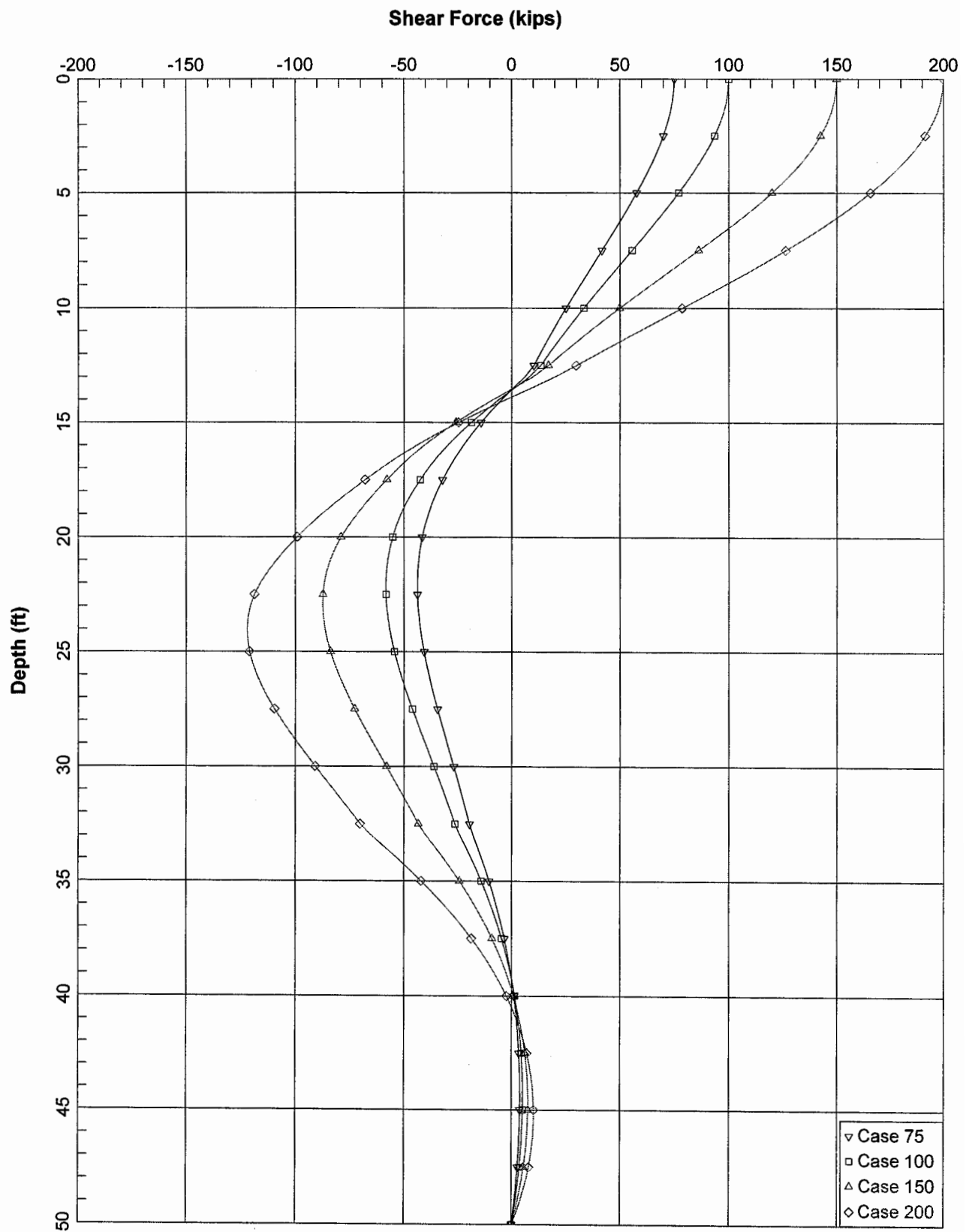
The analysis ended normally.



48-inch Diameter Shaft- P1-Parking Garage



48-inch Diameter Shaft P1 Parking Garage



54''

05176.lpo

=====

LPILE Plus for Windows, Version 4.0 (4.0.8)
Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

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All Rights Reserved

=====

This program is licensed to:

WS
S

Path to file locations: C:\Program Files\Ensoft\LpileP4\
Name of input data file: 05176.lpd
Name of output file: 05176.lpo
Name of plot output file: 05176.lpp
Name of runtime file: 05176.lpr

Time and Date of Analysis

Date: March 14, 2006 Time: 14:30:13

Problem Title

East Baltimore P1- Parking

Program Options

Units Used in Computations - US Customary Units, inches, pounds

Basic Program Options:

Analysis Type 1:

- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:

- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum bending moment, and shear force only
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:

- Number of pile increments = 100

05176.lpo

- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:

- Only summary tables of pile-head deflection, maximum bending moment, and maximum shear force are to be printed in output file.

Pile Structural Properties and Geometry

Pile Length = 600.00 in
Depth of ground surface below top of pile = .00 in
Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	54.000	417392.7100	2290.2000	3000000.000
2	600.0000	54.000	417392.7100	2290.2000	3000000.000

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = .000 in
Distance from top of pile to bottom of layer = 156.000 in
p-y subgrade modulus k for top of soil layer = 35.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 35.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 156.000 in
Distance from top of pile to bottom of layer = 396.000 in
p-y subgrade modulus k for top of soil layer = 85.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 85.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 396.000 in
Distance from top of pile to bottom of layer = 900.000 in
p-y subgrade modulus k for top of soil layer = 135.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 135.000 lbs/in**3

(Depth of lowest layer extends 300.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth
is defined using 6 points

Point	Depth X	Eff. Unit Weight
-------	---------	------------------

No.	in	lbs/in**3
1	.00	.06300
2	156.00	.06300
3	156.00	.03600
4	396.00	.03600
5	396.00	.03900
6	900.00	.03900

Shear Strength of Soils

Distribution of shear strength parameters with depth
defined using 6 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k _{rm}	RQD %
1	.000	.00000	28.00	-----	-----
2	156.000	.00000	28.00	-----	-----
3	156.000	.00000	32.00	-----	-----
4	396.000	.00000	32.00	-----	-----
5	396.000	.00000	36.00	-----	-----
6	900.000	.00000	36.00	-----	-----

Notes:

- (1) Cohesion = uniaxial compressive strength for rock materials.
- (2) Values of E50 are reported for clay strata.
- (3) Default values will be generated for E50 when input values are 0.
- (4) RQD and k_{rm} are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 4

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)

Shear force at pile head = 75000.000 lbs

Bending moment at pile head = .000 in-lbs

Axial load at pile head = 1200000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 2

05176.lpo
Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 100000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 1200000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 3

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 150000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 1200000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 4

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 200000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 1200000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 75000.000 lbs
Specified bending moment at pile head = .000 in-lbs
Specified axial load at pile head = 1200000.000 lbs

(Zero moment for this load indicates free-head conditions)

Output Verification:

Computed forces and moments are within specified convergence limits.

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 100000.000 lbs
Specified bending moment at pile head = .000 in-lbs
Specified axial load at pile head = 1200000.000 lbs

(Zero moment for this load indicates free-head conditions)

Output Verification:

Computed forces and moments are within specified convergence limits.

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 3

Pile-head boundary conditions are Shear and Moment (BC Type 1)
 Specified shear force at pile head = 150000.000 lbs
 Specified bending moment at pile head = .000 in-lbs
 Specified axial load at pile head = 1200000.000 lbs

(Zero moment for this load indicates free-head conditions)

Output Verification:

Computed forces and moments are within specified convergence limits.

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 4

Pile-head boundary conditions are Shear and Moment (BC Type 1)
 Specified shear force at pile head = 200000.000 lbs
 Specified bending moment at pile head = .000 in-lbs
 Specified axial load at pile head = 1200000.000 lbs

(Zero moment for this load indicates free-head conditions)

Output Verification:

Computed forces and moments are within specified convergence limits.

Summary of Pile-head Response

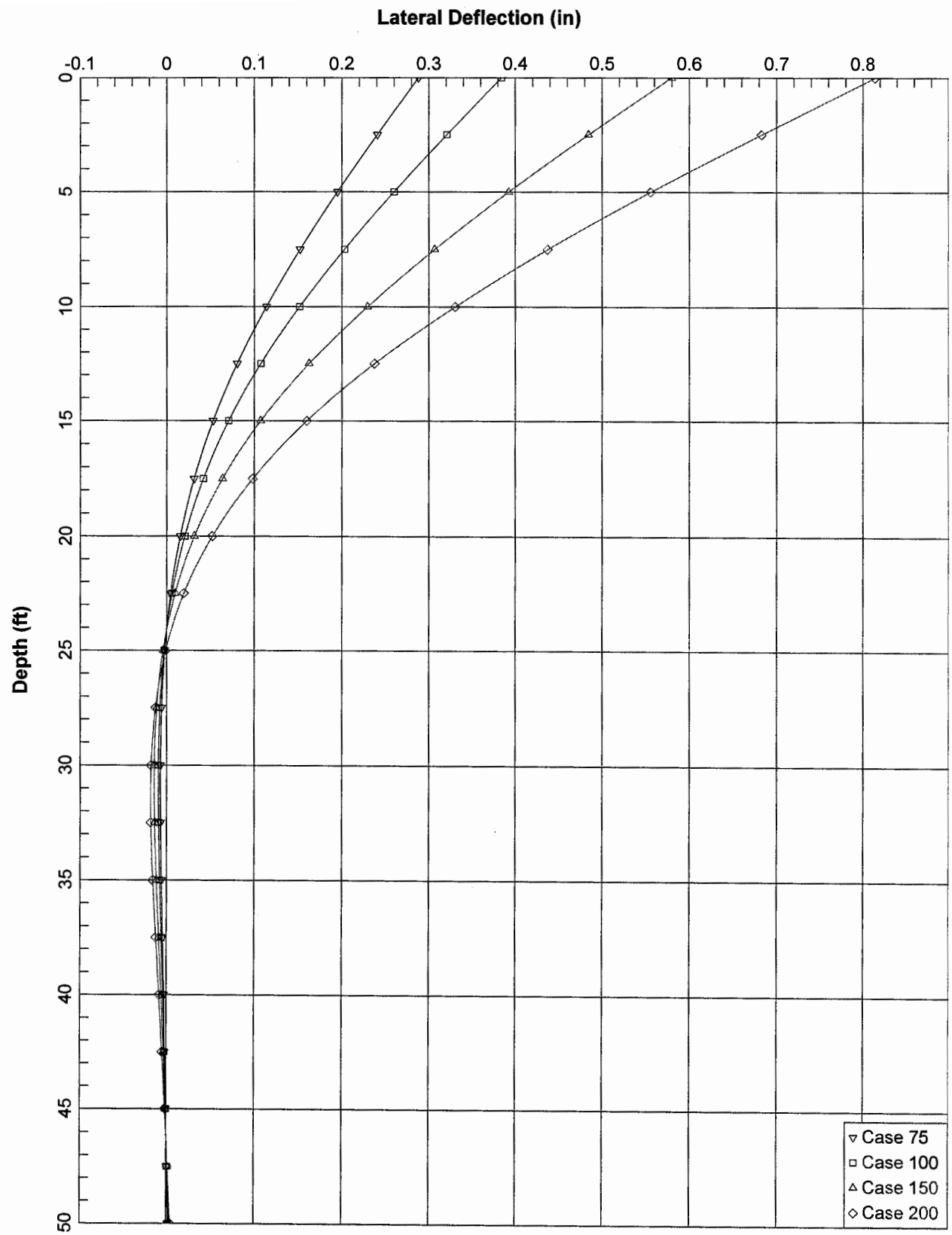
Definition of symbols for pile-head boundary conditions:

y = pile-head displacement, in
 M = pile-head moment, lbs-in
 V = pile-head shear force, lbs
 S = pile-head slope, radians
 R = rotational stiffness of pile-head, in-lbs/rad

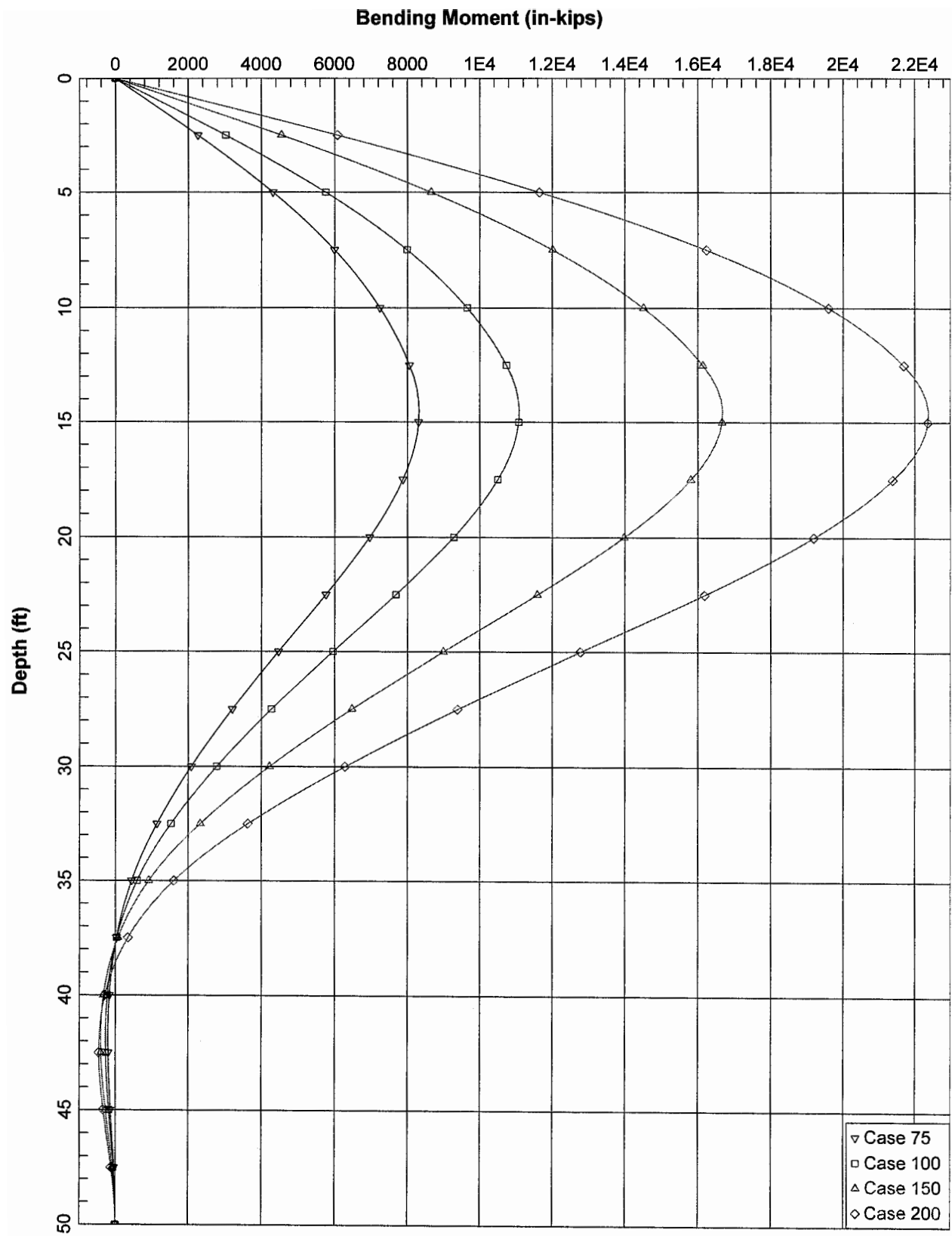
BC Type	Boundary Condition 1	Boundary Condition 2	Axial Load lbs	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 75000.000	M= 0.000	1.200E+06	.2880	8.318E+06	75000.0000
1	V=100000.000	M= 0.000	1.200E+06	.3840	1.109E+07	100000.0000
1	V= 1.50E+05	M= 0.000	1.200E+06	.5797	1.668E+07	150000.0000
1	V= 2.00E+05	M= 0.000	1.200E+06	.8142	2.238E+07	200000.0000

The analysis ended normally.

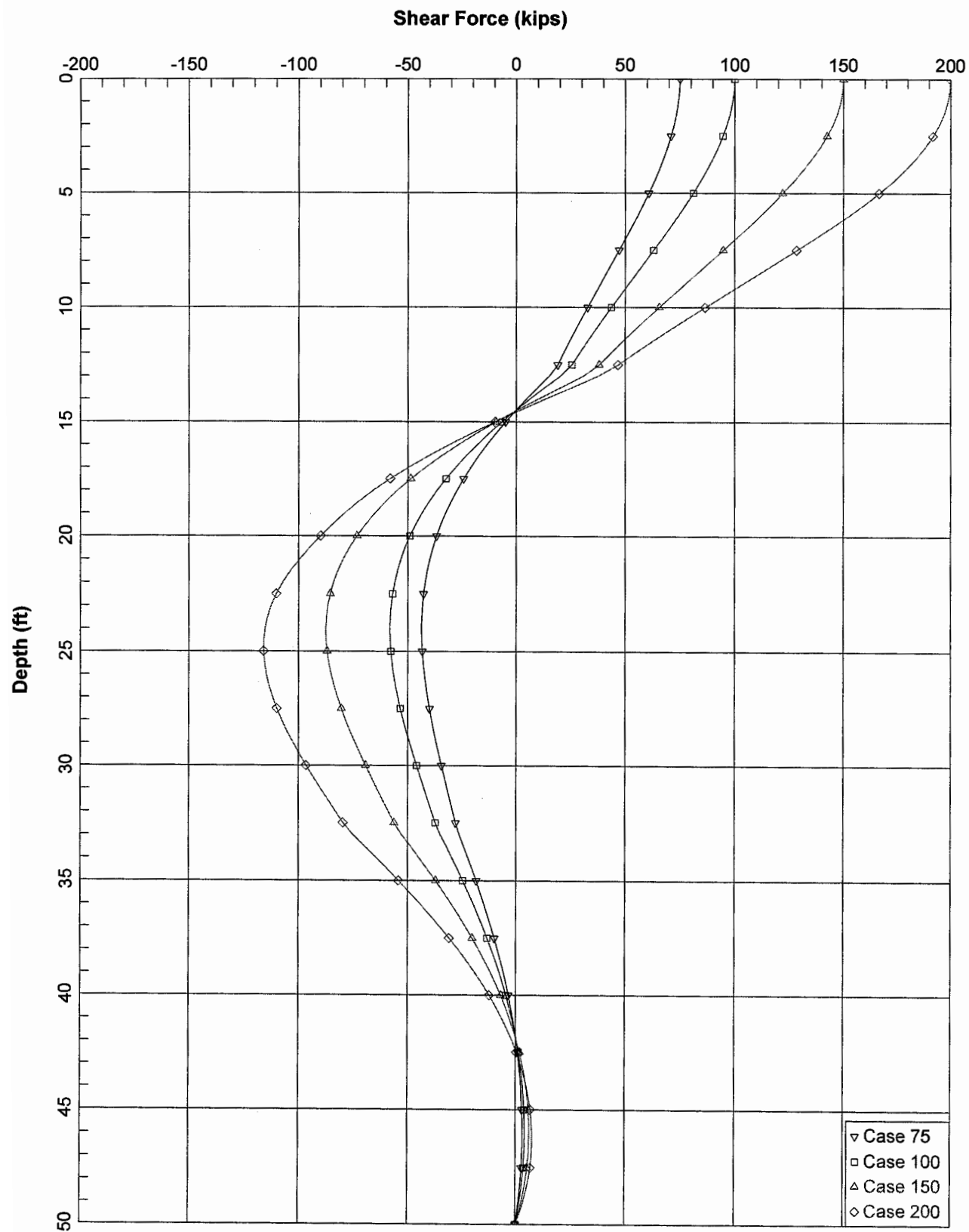
05176.1po



54-inch Diameter Shaft- P1-Parking Garage



54-inch Diameter Shaft P1 Parking Garage



54-inch Diameter Shaft P1 Parking Garage

APPENDIX C

Seismic Design Criteria

Date and Time: 3/14/2006 1:28:17 PM

Central Longitude = -076.562221

(sec) (%g)

1.0 006.4 Map Value, Soil Factor of 1.0

1.0 010.9 Soil Factor of 1.70

Central Longitude = -076.562221

(sec) (%g)

1.0 006.4 Map Value, Soil Factor of 1.0

$$F_v = 1.70$$

(sec) (%g)

0.200 023.8 T=0.2, FaSs

0.600 018.1

0.900 012.1

1.200 009.0

1.400 007.8

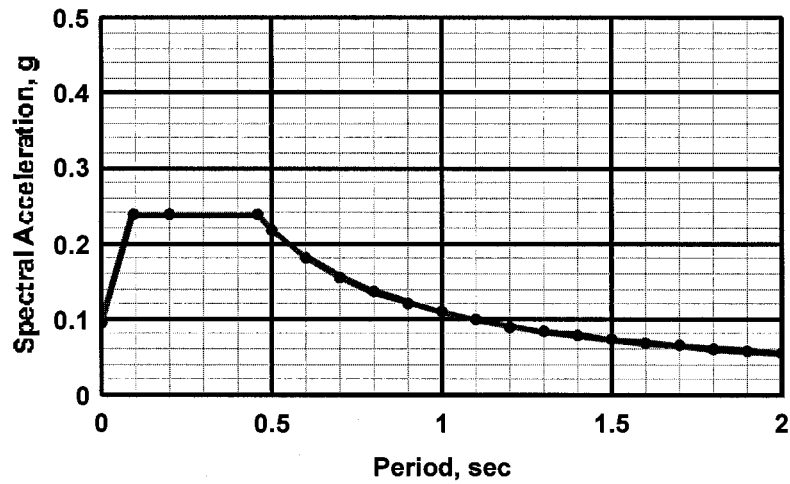
1.600 006.8

1.800 006.0

2.000 005.4

TABLE 1

Maximum Considered Earthquake Ground Motion
 Fa = 1.20 F1 = 1.70
 Zip Code = 21205
 Central Lat. = 39.301588 deg Central Long. = -76.562221 deg



Period, sec	Sa, g
0.00	0.095
0.09	0.238
0.20	0.238
0.46	0.238
0.50	0.217
0.60	0.181
0.70	0.155
0.80	0.136
0.90	0.121
1.00	0.109
1.10	0.099
1.20	0.090
1.30	0.083
1.40	0.078
1.50	0.072
1.60	0.068
1.70	0.064
1.80	0.060
1.90	0.057
2.00	0.054

APPENDIX D

Draft Drilled Shaft Specifications

East Baltimore Development P1 Parking Garage
DRILLED CAISSONS / CAISSONS

PART 1 - GENERAL

1.10 SECTION INCLUDES:

- A. Provide equipment, material, devices, labor and supervision necessary to furnish and install, but not necessarily limited to the following:
 - 1. Drilling and excavating of shafts for drilled caissons.
 - 2. Cleaning of drilled caisson bottoms and sockets.
 - 3. Dewatering of drilled caisson excavations.
 - 4. Steel casings and liners.
 - 5. Reinforcing and dowels from drilled caissons into columns or grade beams directly above.
 - 6. Concrete and concreting of drilled caissons.
 - 7. Disposal of excavated materials.
 - 8. Survey work - including layout, surveys, elevations, and measurements.

1.11 BASIS OF CONTRACT

- A. Contract shall be based on the number of caissons shown on the drawings, satisfactorily installed to conform to the diameters and elevations shown. The Contract for the caissons will be on a Lump Sum basis, with adjustments made for work as actually measured in-place. Limited amounts of excavation below these depths are expected. Some obstructions may be encountered, consisting of demolition materials and the remains of previous existence. Groundwater may be encountered in the shafts.

1.12 RELATED SECTIONS

- 1. Section 02200: Earthwork
- 2. Section 3300: Concrete

1.20 REFERENCES

- A. ACI 301 - Specifications for Structural Concrete for Buildings.
- B. SP-15 - ACI Field Reference Manual: Specifications for Structural Concrete for Buildings with Selected ACI and ASTM References.

1.30 MEASUREMENT AND PAYMENT

- A. Basis of Bids: Bids shall be based on the number of drilled caissons, length from top elevation to bottom of the shaft and the diameter of the shaft, as shown on the Drawings.
- B. No payment will be made for drilled caisson construction not represented by a submitted report verified by the Geotechnical Engineer.
- C. Basis for Payment:
 - 1. Payment for drilled caissons will be made on the actual quantities of drilled caissons in-place and accepted. The actual length and shaft diameter may vary to coincide with the elevations where satisfactory bearing strata is encountered, with the actual bearing values of the bearing strata determined by the Geotechnical Engineer and with the stability and characteristics of the soil strata. (Adjustments to the Contract Sum will be made in accordance with unit prices for greater or lesser quantities of materials.)
 - 2. There will be no compensation for excavation, concrete fill, reinforcing, telescoping of casings, or other costs due to unauthorized overexcavating shafts in any dimensions. No payment will be made for rejected drilled caissons.
 - 3. There will be no compensation for excavation from present grade to top of drilled caisson if drilled caisson work should proceed before site work excavation and grading is complete.
 - 4. Prices quoted shall include full compensation for labor, materials, tools, equipment and incidentals required for excavation, trimming, shoring casing, dewatering, reinforcement, concrete and other necessary items for complete installation.
 - 5. Excavated materials will be classified in accordance with the following descriptions.
 - a. Caisson earth excavation (normal excavation) is defined as materials encountered between the top of the drilled shaft and the final bearing surface that can be excavated utilizing standard drilled shaft excavation

methods and the minimum installation equipment defined herein. Standard excavation methods and the minimum installation equipment defined herein. Standard excavation methods include conventional earth auger, stepped taper bit, carbide teeth on auger, or other attachments to the auger.

b. Caisson rock excavation or obstructions are defined as any material or obstruction that cannot be drilled with the drilling equipment specified as the minimum installation equipment with an auger. The top of the rock is defined as where a 36-inch diameter auger equipped with carbide rock teeth advances less than two inches per five minutes of drilling at full crowd force. No blasting will be allowed except with approval, in writing, from the Architect. Rock excavation will be paid for the volume of the shaft based on the plan diameter within the vertical limits of the area where rock excavation is required. All soil-filled cavities, rock fragments, and voids included in the rock excavation area shall be considered rock for the full volume of the shaft from the initial contact with rock for payment purposes. Where possible, normal drilling will be resumed after the rock or obstruction is removed.

6. Payment for obstructions as defined herein will be for the volume of caissons within the vertical limits of the obstructions only. The top and bottom limits of the obstructions will be measured by the Geotechnical Engineer. The payment volume will be the caisson cross-sectional areas as shown on the Contract Documents times the height between the upper and lower limits of the obstruction as measured by the Geotechnical Engineer.

7. Measurements will be based on plan diameter and plan top of caisson.

D. Unit Prices:

1. Payment for additional work and credit for deductions in work, shall be computed in accordance with the following Schedule of Unit Prices, which schedule shall remain in effect until all work of the Contract has been completed and accepted.
2. The unit prices are firm, lump sum, all-inclusive cost of the work, including materials, labor, layout, drafting, balancing, testing, tools, sundries, scaffolding, trucking, transportation, cleaning, supervision, overhead, profit, and taxes.
3. When determining the number of units of work, calculate the actual surface, volume, length, hours or number of individual items listed for the class of work, complete, in-place, and accepted or omitted. Allowances for waste, loss, breakage, damage, or difficulties will not be accepted.

<u>Unit Price Number</u>	<u>Description</u>	<u>Unit</u>
1	<u>DRILLED CAISSON WORK</u>	
1.1	Normal Excavation of Drilled Caissons:	
1.1.1	Depth greater than shown - Add	Cubic YD
1.1.2	Depth greater than shown - Deduct	Cubic YD
1.1.3	Additional drilled caisson - Add	Cubic YD
1.1.4	Increase shaft diameter - Add (before drilled caisson is excavated)	Cubic YD
1.4	Obstructions: Excavation - Add	
1.5	Concrete:	
1.5.1	Greater volume than shown - Add	Cubic YD
1.5.2	Lesser volume than shown - Deduct	Cubic YD
1.6	Reinforcing Steel and Dowels:	
1.6.1	Greater weight than shown - Add	Pound
1.6.2	Lesser weight than shown - Deduct	Pound
1.7	Permanent Steel Sleeves: Different sizes, left in-place	Add Linear Ton

1.40 SUBMITTALS

- A. Submit concrete material test reports for materials proposed for use in concrete mixes.
- B. Submit preliminary drilled caisson reports of actual allowable bearing capacity at the bottom of each shaft, issued as soon as possible after testing each excavation.

- C. Submit concrete design mix reports, listing all mixes required and their respective test results.
- D. Submit drilled caisson reports.
- E. Submit one copy of the concrete batch trip ticket containing information as specified in ASTM C-94 paragraph titled "Batch Ticket Information" including items 16.2.1 through 16.2.8. The ticket shall also clearly show the amount of water for the entire batch which may be added in the field that will not exceed the water cement ratio specified by the concrete design.
- F. Concrete test reports, recording all pertinent information and compliance with project specifications.

1.50 QUALITY ASSURANCE

- A. **Installer Qualifications:** Contractor specializing in drilled caisson construction who can demonstrate that he has experience working in similar soil, who has at least five years experience in work of similar scope and nature, and availability of qualified equipment required herein.
- B. **Codes and Standards:** Perform drilled caisson work in compliance with the applicable requirements of Baltimore City codes and OSHA, and any other applicable governing authorities having jurisdiction, including provisions for adequate protection to persons and property.
- C. **Survey Work:** Engage a registered surveyor acceptable to the Owner, Architect, and Construction Manager to perform all surveys, layouts, and measurements for drilled caisson work. The surveyor shall conduct the layout work for each drilled caisson to the lines and levels required before excavation, and shall record the actual measurements of each drilled caissons horizontal axial location, shaft diameter, bottom and top elevations, deviations from specified tolerance, and other data as required.
- D. **Concrete Testing Services:** The Owner shall employ a testing laboratory acceptable to the Architect to perform material evaluation tests and to evaluate concrete mix design. Costs of testing shall be borne by the Owner.
 - 1. Materials and installed work may require testing and retesting, as directed by the Architect, at any time during the progress of the work. Allow free access to material stockpiles and facilities at all times. The retesting of rejected materials and installed work shall be done at the Contractor's expense.
 - 2. Submit written reports to the Architect, for each material sampled and tested, prior

to the start of work. Provide the project identification name and number, date of report, name of Contractor, name of concrete testing service, source of concrete aggregates, material manufacturer and brand name for manufactured materials, and test results. Indicate whether or not material is acceptable for intended use.

3. Certificates of material properties and compliance with specified requirements may be submitted in lieu of testing, when acceptable to the Architect. Certificates of compliance must be signed by the material's producer and the Contractor.
- E. Design Criteria: The design of caisson foundations (size, type, and depth) have been indicated as accurately as possible and are based on the results of the subsurface explorations made and the bearing capacity indicated. The designs may vary accordingly, with the materials actually encountered at their respective depths. Acceptable bearing will be determined by the Geotechnical Engineer and designs confirmed or altered by the Architect.
1. See Geotechnical Engineering Report prepared by D.W. Kozera, Inc. dated May 8, 2002 for test boring data.
- F. The Contractor shall be responsible for coordination and proper relation to the work of this section to the building structure and to the work of all trades. The Contractor shall visit the premises to thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and shall advise the Architect, in writing, of any discrepancy before starting any work.

1.60 JOB CONDITIONS

- A. Protection: Protect all personnel required by OSHA and other regulatory requirements. Provide enclosures around each open hole. Construct temporary barriers to prevent intrusion of surface water and debris. Remove when caissons are filled and complete. Protect completed tops from damage.
- B. Dewatering: Water will be encountered during drilling operations; provide pumping equipment as required to keep shafts dry and suitable for inspection and placement of reinforcing and concrete. The Contractor shall make provisions for unbalanced hydrostatic water pressure to prevent settlement of earth.
- C. Existing Utilities:
1. Locate existing underground utilities by careful hand excavations before starting drilled caisson excavation operations. If utilities are to remain in place, provide protection from damage during drilled caisson operations.
 2. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult with the Construction Manager immediately for directions as to procedure. Cooperate with the Owner and public or private utility

Caisson Specifications

companies to keep services and facilities in operation.

3. Do no interrupt existing utilities serving facilities occupied and used by the Owner or others, except when permitted, in writing, by the Architect and then only after acceptable temporary utility services have been provided.

D. Examination of Site:

1. Visit and examine the work site and take into consideration all conditions that may affect the Work.
2. Inspect the site and be thoroughly familiar with the Contract Documents. The failure to examine the Contract Documents will in no way relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

1.70 SAFETY PROVISIONS

- A. The Contractor shall have at the job site, all equipment and materials needed to provide safe descent into pier holes for the Geotechnical Engineer and any other personnel who may need to enter the holes, and provide personnel to observe any personnel at all times when he is in a hole.
- B. Equipment: Furnished by the Contractor and kept immediately adjacent to the hole at all times when any person is in the hole shall include hoist, ladder, or other means for descent into the hole, and hoist line with safety hook for rescue purposes. In addition, the Contractor shall have on the site, protective casing, air (O₂) meter, combustible gas meter, air supply, electric light (safety lamp) on safety cord long enough to reach the bottom of the hole, and submersible pump. The use of a pump driven by an internal combustion motor will not be permitted in the hole. Electrically driven pumps, if used in the hole, shall be of the explosion-proof type.

PART 2 - PRODUCTS

2.10 MATERIALS

- A. Concrete, reinforcement and related materials: Type specified in Division 3 and amended to meet the requirements specified herein.
 1. Concrete Slump Limits: Proportion and design mixes to result in concrete slump at point of placement of not less than 5-inches and not more than 8-inches.
 2. Concrete shall have a minimum 28-day compressive strength of 3,000 psi.
- B. Portland Cement: ASTM C-150, Type 1, as specified in Section _____.

- C. Aggregates: ASTM C-33, and in accordance with ACI 301, as specified.
- D. Water-Reducing Admixtures: ASTM C-494, Type A, as specified in Section ____.
 - 1. "Eucon Super WR-75" by the Euclid Chemical Company.
 - 2. "Pozzolith Normal" by Master Builders.
 - 3. "Plastocrete 161" by Sika Chemical Company.
- E. Reinforcing Bars and Dowels: ASTM A-615, Grade 60. Ties and hoops: ASTM A-615, Grade 60, as specified in Section _____.

PART 3 - EXECUTION

3.10 EXAMINATION

- A. Examine the areas and conditions under which drilled caissons are to be installed.
- B. Notify the Construction Manager and Architect, in writing, of conditions detrimental to the proper and timely completion of the work.
- C. Do not proceed with the work until unsatisfactory conditions have been corrected.
- D. Commencement of work means acceptance of conditions.

3.20 GENERAL

- A. Perform concrete work in accordance with the American Concrete Institute "Specifications for Structural Concrete for Buildings" ACI 301, as modified herein.
 - 1. Provide at least one copy of ACI SP-15 available in the field office at all times.

3.30 EXCAVATION

- A. Excavate holes for drilled caissons to the required bearing strata of elevations shown on the Drawings, and as verified by the Geotechnical Engineer.
- B. Excavate holes for closely-spaced drilled caissons, only after adjacent holes are filled with concrete and allowed to set for 24 hours. Closely-spaced holes are those with less than 8.0-feet clear between them.
- C. Drilled caisson design and dimensions shown are minimum. The design of the drilled caisson is based on the assumed strata bearing capacity. If the bearing strata is not capable of maintaining bearing capacity assumed, the foundation system will be revised as directed by the Architect. Revisions will be paid for in accordance with Contract conditions relative to changes in the Work.

- D. If required, install casings as excavation proceeds so that earth walls are maintained without spilling into the shaft.
- E. Drill through soil overburden to the design founding level shown on the Contract Drawings, or as indicated by the Geotechnical Engineer in the field. Provide shafts and sockets with diameters at least equal to that shown on Drawings.
- F. TOLERANCES:
1. Locate centerline of drilled caissons to be on centerline of bearing construction, unless otherwise shown on the Drawings.
 - a. Do not exceed the following tolerances: Shaft centerline location at top of caisson: 3-inch maximum variation. Shaft variation to plumb: 1.5-inch in 10-feet for full depth.
 - b. If the above tolerances are exceeded, provide additional or corrective construction. Submit proposed corrective construction methods to the Architect for review before proceeding. In the event a shaft is not within the specified tolerances, for any reason, corrective methods shall be performed by the Contractor at no extra cost to the Owner.
 - c. The minimum center-to-center spacing between drilled caissons proposed by the Contractor for corrective work shall be twice the diameter of the drilled caisson.
- G. INSTALLATION EQUIPMENT:
1. Form by means of a power-driven rotary, foundation drilling rig. Provide equipment in first-class condition and maintained to operate in that condition at all times.
 2. Minimum installation equipment should be any mobile, truck-mounted drilling machine having an overall minimum torque of 50,000-foot-pounds. In addition, the kelly bar shall be equipped with a hydraulic crowd system capable of raising the rear leveling jacks completely clear of the ground while the auger is turning, to apply the maximum dead weight of the drill machine to ensure maximum penetration. The machine shall be capable of applying a 37,000-pound total crowd force to the auger while drilling the shafts. The machine shall have the capability of rotating at rated kelly speed while drilling into any material with a maximum crowd force applied to the kelly.
 3. Any crane-mounted drill machine shall meet the same minimum requirements as specified above as to weights of the drill machine and kelly bar or bars. This machine shall be equipped with a hydraulic crowd system. The drill unit, when affixed to the crane, shall have a solid connection from the top of the drill unit to the crane itself, in addition to the hookup point at the base, to ensure that the

hydraulic crowd has an adequate reaction to apply the required maximum force.

H. OBSTRUCTIONS:

1. If rock, boulders, abandoned foundations, or other unforeseen obstructions are encountered which cannot be removed by normal excavation methods and specified equipment as defined herein and if such obstructions are not indicated by available subsurface data, removal of such obstructions will be paid for in accordance with terms of the Contract relative to changes in the Work. Normal excavation methods include conventional earth auger, stepped taper bit, carbide teeth on auger, or other attachments to auger.
2. Remove such obstructions by hand labor using air-powered tools, core barrels with drilled caisson drilling equipment, or other safe methods recognized in the construction industry. The Geotechnical Engineer will observe any obstruction excavation and reach an agreement with the Drilled Caisson Contractor as to the volume of obstruction excavation involved at the time the work takes place.
3. Where possible, return to standard excavation methods after obstruction is removed.
4. The work of this Section includes demolition and removal of rock, boulders, concrete, masonry, and other subsurface obstructions which are indicated by the Contract Documents or the available subsurface exploration data, and such work will not be considered a Change in the Work.

I. REFUSAL:

1. Refusal is defined where a 36-inch diameter auger with steel flight plate, of not less than ½-inch thickness and equipped with carbide rock teeth in good condition advances less than 2-inches per 5 minutes of drilling at full crowd force.

J. DEWATERING:

1. Provide and maintain pumping equipment to keep the drilled caisson excavations free of water before placing concrete. Concrete shall not be placed in standing water in excess of 2-inches. If excessive water is encountered and drilling operations must be stopped, consult with the Architect before using alternate methods of construction.
2. Conduct water to site drainage facilities approved by the Architect.

K. LINERS:

1. In drilling the drilled caisson, adequately and securely protect the earth walls, when necessary, against cave-ins, displacement of the surrounding earth, and for the retention of groundwater by means of steel cylinder liners or casings. Use liners

or casings to line all holes, unless permission is granted for their omission by the Geotechnical Engineer and the Architect. Temporary casings may be left in-place or may be withdrawn as the concrete is placed, at the Contractor's option.

2. If removable steel liners are used, they may be withdrawn as the concrete is being placed providing the bottom of the liner is a minimum of 5-feet below the top of concrete. Maintain a sufficient head of concrete to prevent a reduction in the diameter of the drilled caisson shaft due to earth pressure on the fresh concrete.

L. DEPTH OF BEARING STRATA:

1. The founding elevations shown are for bidding purposes. Actual elevations will be determined by the Geotechnical Engineer and the Architect. If indicated depth of shaft excavation is reached without developing required strata bearing capacity, immediately suspend excavation operations and inform the Geotechnical Engineer. The Geotechnical Engineer will determine procedures to be following in each instance and be approved by the Architect.
2. Where changes in indicated depth, dimensions, or additional soil borings are required, proceed with such work when directed by the Geotechnical Engineer and the Architect.

M. No payment will be made for the extra length when drilled caisson shafts are excavated to a greater depth than required or authorized by the Architect, due to overdrilling by the Contractor. Complete the drilled caisson and fill the extra depth with concrete, if all other conditions are satisfactory. Overexcavated shafts will be measured and paid for to the original design or authorized depth.

N. Take all necessary precautions to maintain a safe operation in connection with drilled caisson installations. Provisions for adequate protection to persons and property shall comply with applicable requirements of governing authorities having jurisdiction.

O. Remove excavated material and legally dispose of it off of the site unless directed otherwise by the General Contractor.

3.40 REINFORCING STEEL AND DOWELS

A. Design reinforcing steel and dowels in accordance with ACI 318 "Building Code Requirements for Reinforced Concrete" and install in accordance with ACI 315 "Manual of Standard Practices for Detaining Reinforced Concrete Structures" and CRSI "Recommended Practice for Placing Reinforcing Bars".

B. Before placing, clean reinforcing steel and dowels of loose rust, scale, dirt, grease, and other material which impair bond.

C. Fabricate and erect reinforcing cages in shafts as one continuous unit. Place reinforcement

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accurately and symmetrically about axis of hole and hold securely in position during concrete placement providing a minimum 3-inches of concrete cover.

- D. Use templates to set anchor bolts, leveling plates, and other accessories furnished under Work of other Sections. Provide blocking and holding devices to maintain required position during concrete placement.
- E. As casing is withdrawn, take care to ensure reinforcement is not disturbed or exposed to the surrounding soils. Securely attach spacers, capable of sliding on the casing, to the reinforcement.
- F. Protect exposed ends of dowels (and anchor bolts) from mechanical damage and exposure to the weather.

3.50 CONCRETE PLACEMENT

- A. Special observation is required during placement of concrete to ensure the drilled caisson's integrity and to ensure minimum diameter indicated on the Drawings.
- B. Install reinforcement cage and fill drilled caisson with concrete immediately after inspection and approval by the Geotechnical Engineer and the Architect. Use protection sheets (cut out to receive concrete over excavation openings) extending at least 12-inches beyond edge in all directions.
- C. Place concrete continuously without interruption and in a smooth flow without segregating the mixed materials.
- D. Place concrete by means of a bottom discharge bucket, flexible drop chute, elephant trunk hopper, or tremie. Provide runways and other means for conveying concrete to placement locations. Concrete shall fall vertically; do not allow the concrete to hit the sides of the shaft or reinforcing cage.
- E. Infiltration of groundwater from a source at or near the bottom of the drilled caisson at a rate of less than 1/4-inch rise per minute at the bottom is considered to be a "dry" drilled caisson.
- F. Place concrete in a dry drilled caisson excavation at a sufficient rate to balance any infiltrating of water pressure. There shall be less than 2-inch depth of water in the bottom of caisson when concrete placement begins.
- G. Infiltration of groundwater, exceeding 1/4-inch rise per minute, is considered to be a "wet drilled caisson" and concrete shall be placed by tremie method such as gravity flow through a vertical pipe of sufficient length to reach the bottom of the drilled caisson. Before placing concrete by the tremie method, allow the drilled caisson to fill with water to the natural water level so that the water head inside and outside the drilled caisson is balanced. Every effort shall be made to obtain a dry hole by pumping. If these efforts fail, place concrete

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by the tremie method. Control placement operations to ensure that the tremie is not broken during continuous placing from bottom to top. Other methods of depositing concrete underwater may be used, if acceptable to the Architect.

- H. The free, unobstructed fall of concrete produces adequate compaction of concrete up to the top 5-feet of depth. Mechanically vibrate the top 5-feet of drilled caisson concrete. If placed by tremie, vibrate the top 15-feet of the drilled caisson concrete.
- I. Remove segregated concrete and laitance as the concrete placement for each drilled caisson is being completed to achieve a continuous column of good quality concrete up to design cut-off elevation.
- J. Place all drilled caisson concrete monolithically. Construction joints or cold joints shall be considered if placing operations are delayed over one-hour. If, after all possible efforts, a construction/cold joint is unavoidable, leave the resulting shaft surface approximately level and place the caisson's vertical reinforcement so it extends a minimum of 6-feet below the joint before completing the drilled caisson.
 - 1. Extend, as required, the caisson's vertical reinforcement and hoops to the elevation indicated on the drawing. Splice the vertical reinforcement with a Class C splice or a Cadweld full-welded splice.
 - 2. Roughen and clean the joint surface.
 - 3. Coat the joint surface with a concrete bonding agent.
 - 4. Slush the joint surface with a 1-to-1 cement grout.
 - 5. Do not remove the shaft interior casing below the joint.
 - 6. Complete the shaft with subsequent concrete placement the same day.
- K. Stop the concrete placement at the cut-off elevations shown. Screed-off true and level and apply a scoured, rough finish, unless otherwise shown. Where cut-off elevation is above ground elevation, from the top section above grade and extend the shaft to the required elevation.
- L. Cold Weather Placing:
 - 1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in accordance with ACI 306 and as herein specified.
 - 2. When air temperature has fallen to or is expected to fall below 40-degrees F., uniformly heat all water and aggregates before mixing, as required, to obtain a concrete mixture temperature of not less than 50-degrees F., and not more than

90-degrees F. at point of placement.

3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
4. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless approved, in writing, by the Architect.

M. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in accordance with ACI 305 and as herein specified.
2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90-degrees F. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.
3. Place concrete immediately upon delivery. Keep exposed concrete surfaces and formed shaft extensions moist by fog sprays, wet burlap, or other effective means.
4. Do not use retarding admixtures unless approved, in writing, by the Architect.

3.60 FIELD QUALITY CONTROL

A. The Contractor is responsible for quality control.

1. Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

B. Quality Control Monitoring:

1. The Owner shall employ the Geotechnical Engineer (D.W. Kozera, Inc.) to inspect the installation of the caissons, to ensure the required bearing capacity, and to certify to the Architect compliance in all particulars to specification requirements. Such an agency shall have a full-time inspector at the site the entire duration of the installation. The Geotechnical Engineer shall be a registered professional engineer by the State of Maryland.
2. The Geotechnical Engineer's representatives shall keep a complete record of all operations and shall submit written reports to the Architect and others, as required.
3. The Owner shall employ the Geotechnical Engineer to test concrete and observe steel reinforcement.

C. Drilled Caisson Reports

1. Records shall be maintained by both the Geotechnical Engineer and the Contractor for each installed drilled caisson.
2. Assist the Geotechnical Engineer in making the necessary measurements and observations, and maintain Contractor's records as required for preparation and submission of complete reports on drilled caisson construction. Submit a separate report for each drilled caisson. Submit each report within a period of ten days after final concreting.
3. As a minimum, include the following information of each caisson:
 - a. Identification of drilled caisson by number, type, and location.
 - b. Type of equipment used.
 - c. Dates when drilled caisson excavation was started and completed.
 - d. Design and actual shaft diameters drilled.
 - e. Ground elevation at drilled caisson location.
 - f. Design and actual elevation of top and bottom of drilled caisson.
 - g. Assumed elevation of top of rock at drilled caisson location.
 - h. Actual elevation of top of rock.
 - i. Volumes of soil and rock excavated.
 - j. Lengths of probe hole drilled, and time to drill each foot. The depths and thicknesses of any soft seams.
 - k. Actual allowable bearing capacity at bottom.
 - l. Levelness of shaft bottom.
 - m. Statement of type, length, diameter and elevation of any casing permanently installed in the excavation.
 - n. Groundwater conditions.
 - o. Static water level (if allowed to flood).
 - p. Date when excavation was approved for installation of concrete.

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- q. Date when concreting was performed. Include any delays in concreting and report construction joints in shafts.
- r. Concrete placement procedures including quantity of concrete used, including amounts over or under design volume, locations of cold/construction joints, vibration, delays.
- s. Date when drilled caisson construction was completed.
- t. Centerline location at top of drilled caisson.
- u. Variation of shaft from plumb.
- v. Remarks on unique or unusual events or circumstances concerning drilled caisson installation.
- w. Steel reinforcement installed in caisson.
- x. Any other data as may be required.

D. Caisson Inspection

1. Each drilled caisson will be inspected and tested, and be acceptable to the Geotechnical Engineer before placing any concrete. Notify the Geotechnical Engineer at least 24-hours prior to the time the excavations will be ready for inspection and tests.
2. Provide facilities, as required, to assist in the inspection and testing of excavations, and cooperate with inspecting and testing personnel to expedite the Work.
3. The Geotechnical Engineer will witness the placing of the concrete.
4. Dewater, clean, and illuminate the drilled caisson excavations. The Geotechnical Engineer will observe the bottom. When each drilled caisson has been observed and approved, level or step the bottom so that the bearing surface does not slope more than 10-degrees to horizontal with steps not exceeding 12-inches in height, and clean of all loose material before placing concrete.

E. Concrete Testing

1. The Owner shall employ the Geotechnical Engineer to perform quality control testing during construction: Concrete shall be sampled and tested for quality control during the placement of concrete.
2. Slump: ASTM C-143; one test for each concrete load at point of discharge; and one for each set of compressive strength test specimens.

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3. Compression Test Specimens: ASTM C-31; one set of four standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
4. Concrete Temperature: Test hourly when air temperature is 40-degrees F. and below, and when 80-degrees F. and above, and each time a set of compression test specimens are made.
5. Compressive Strength Tests: ASTM C-39; one set for each 100-cubic yards of fraction thereof, of each concrete class placed in any one day.
6. Compression Tests: Each test consists of four concrete cylinders broken under compression. One concrete cylinder shall be broken at 7 days after making, and two concrete cylinders shall be broken at 28-days. The remaining cylinder shall be broken at 56 days if inadequate strength develops after 28 days.
7. Concrete cylinders shall be molded, cured, and tested in accordance with ASTM C-31.
8. Test Reports: Submit immediately upon completion of each test. Test reports shall contain the following information:
 - a. Exact mix, including quantities of admixtures, etc.
 - b. Date of cast.
 - c. Location of caisson.
 - d. Seven day test results for first concrete cylinder.
 - e. Twenty-eight day test results shall be reported with the 7 day and 28 day results indicated on the same report.
9. Contractor's and Geotechnical Engineer's Duties:
 - a. Testing laboratory shall furnish all materials and labor for making concrete cylinders.
 - b. The Contractor shall provide suitable storage facilities at the job site for test concrete cylinders. It will be the Contractor's responsibility to store them in a moist condition at the job site. It will be the Geotechnical Engineers responsibility to transport the concrete cylinders to the laboratory in time for tests.
10. The cost of concrete testing shall be borne by the Owner.

11. Additional Concrete Tests: The testing service shall take core samples of in-place concrete when test results are such that there is reasonable doubt that the specified concrete strengths and other characteristics have been attained.
 - a. The testing service shall conduct tests to determine the strength and other characteristics of the in-place concrete by compression tests on cored cylinders complying with ASTM C-42, or by load testing as outlined in ACI 318, or others as directed. The Contractor shall pay for such tests conducted and any other additional testing as may be required.
 - b. Complete continuous coring of caissons may be required, at the Contractor's expense, where time for removal of temporary casing exceeds the specified limits, or where observations of placement operations indicated cause for suspicion of the quality of the concrete, presence of voids, segregation, or other possible defects.
12. Defective Concrete: Caissons which have 28 day compressive strength less than _____ psi shall be replaced at no additional cost to the Owner. Furthermore, the cost of any concrete caps to incorporate larger numbers of caissons will be deducted from the contract sum.