McPHAIL ASSOCIATES, INC

Geotechnical Engineers

October 28, 2009

U.S Environmental Protection Agency
Municipal Assistance Unit (CMU)
1 Congress Street, Suite 1100
Boston, MA 02114-2023

Attention: Dewatering GP Processing

Massachusetts Department of Environmental Protection
Division of Watershed Management
627 Main Street
Worcester, MA 01608

Attention: Mr. Robert D. Kubit

Reference: Spencer Row Housing; 205 Spencer Avenue; Chelsea, Massachusetts
Notice of Intent for Construction Dewatering Discharge Under Massachusetts Dewatering General Permit (DGP) MAG070000

Ladies and Gentlemen:

The purpose of this letter report is to provide a summary of the site environmental conditions and groundwater quality information in support of an application for permission from the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) to temporarily discharge groundwater into the Chelsea Creek via a storm drain system during construction at the above referenced site. Refer to **Figure 1** entitled Project Location Plan for the general site locus.

These services were performed and this permit application was prepared in accordance with authorization of Chelsea Neighborhood Developers. These services are subject to the limitations contained in **Appendix A**.

The required NOI Form and the Massachusetts DEP Transmittal Form for Permit Application and Payment are included in **Appendix B**.

Applicant/Owner

The applicant for the Notice of Intent-Dewatering General Permit is:

Chelsea Neighborhood Developers
4 Gerrish Avenue
Chelsea, MA 02150

Attention: Ms. Janet Stearns

Tel: 617-889-1375
Fax: 617-884-8406

2269 Massachusetts Avenue
Cambridge, Massachusetts 02140
617 / 868-1420
617 / 868-1423 (Fax)

Existing Site Conditions

Fronting onto Spencer Avenue to the northwest, the rectangular-shaped subject site is bounded by residential property to the southwest and northeast, and a 2-story metal warehouse to the southeast. The site is approximately 0.78 acres in area. Existing site conditions are shown on the attached **Figure 2**, Site and Discharge Location Plan.

Currently, the majority of the subject site is occupied by a 2-story metal warehouse. In general, the remainder of the subject site consists of a paved and gravel parking area and driveway and areas of overgrown vegetation. The existing ground surface ranges from approximately Elevation +17 to Elevation +21 along Spencer Avenue sloping downward to about Elevation +9 on the southeastern portion of the site.

The existing site conditions shown on **Figures 2** are based on a 20-scale plan entitled "Existing Conditions Survey", dated February 14, 2007 and prepared by Feldman Professional Land Surveyors and a 30-scale plan entitled "Site Utility Plan" dated April 29, 2009 and prepared by Nitsch Engineering. Elevations referenced herein refer to the National Geodetic Vertical Datum (NGVD)

The area surrounding the subject site is generally occupied by commercial and residential property. The site and surrounding area are serviced by public utilities including water and electricity. Wastewater is discharged into the City of Chelsea sanitary sewer system. Catch basins on Spencer Avenue are utilized to control surface water on the subject site which discharge into the combined sewer system. Catch basins on nearby Webster Avenue and Eastern Avenue discharge surface water into the storm drain system.

Proposed Scope of Site Development

It is understood that the proposed construction will consist of demolition of the existing building followed by construction of a three-story residential building occupying approximately 11,600 square feet with one level of below grade space. It is understood that the proposed building is planned to be benched into the existing hillside creating a walk out parking lot level on the southeastern side and a walk-out first floor, onto Spencer Avenue, on the northwestern side of the proposed building. The basement slab is proposed at Elevation +12. The proposed construction is also understood to include driveway areas and utility installation.

A Review of Site History and Surrounding Historical Places

According to a review of historical Sanborn Maps dating from 1889 to at least 1911, the subject site was once occupied by the Chelsea Web Company and T. Martin and Brothers Manufacturing Company which manufactured elastic and performed weaving, winding, and warping at the subject site. From 1950 to 1985, Sanborn Maps indicate that the subject site was occupied by several woodworking and wood finishing companies. Sanborn Maps show that the footprint of the building currently at the subject site has generally remained unchanged since 1950. It is understood that the subject site has remained vacant for approximately the past year.

A review of the most recent National Register of Historical Places for Suffolk County in Chelsea, Massachusetts did not identify records or addresses of Historic Places that exist in the vicinity of the subject site and/or outfall location. A list of Historical Places listed on the National Register of Historic Places on-line database is included in **Appendix C**.

Site Environmental Setting

Based on a review of the DEP Priority Resources Map, the site is not located within a Zone II of a public water supply, an Interim Wellhead Protection Area, or a Zone A of a Class A surface water supply reservoir. The site is not located within a Non-Potential Drinking Water Source Area of medium yield. There are no surface water bodies located within the site boundaries. The nearest surface water body is the Chelsea Creek, located approximately 1,000 feet to the southeast of the subject site. The site is not located within an Area of Critical Environmental Concern (ACEC) nor are ACECs located within 1-mile of the subject site. In addition, the point of discharge in the Chelsea Creek is not an ACEC.

A review of the most recent federal listing of threatened and endangered species published by the U.S. Fish and Wildlife Service did not identify the presence of threatened and/or endangered species at or in the vicinity of the discharge location and/or discharge outfall. In addition, a review of the Massachusetts Division of Fisheries and Wildlife on-line database did not report the presence of threatened or endangered species at the point of discharge and/or the discharge outfall. A list of threatened and endangered species from the U.S. Fish and Wildlife Services and Massachusetts Division of Fisheries on-line databases is included in **Appendix D**.

Site Regulatory Status and Review of Surrounding DEP Release Sites

A review of the current DEP waste site on-line database indicates that the property located at 205 Spencer Avenue is not a DEP-listed MCP site.

The following DEP release sites, based on their proximity to the subject site, were evaluated for the potential to impact the subject site.

412 Eastern Avenue, Release Tracking Number (RTN) 3-11296

This release site is located adjacent to the northeast corner of the subject site. Reportedly, groundwater flow direction at this site is to the south-southeast away from the subject site.

A Phase I Initial Site Investigation and Tier Classification prepared by Web Engineering Associates, Inc. (Web) were submitted to the DEP on March 4, 2005. Based on the report, during 1994 Non-Aqueous Phase Liquid (NAPL) was observed during the removal of three (3) Underground Storage Tanks (USTs) containing gasoline and one UST containing waste oil. According to Web, the release had not migrated to adjacent sites.

An "Amended Phase IV Status Report & Remedial Monitoring Report No. 2" dated September 30, 2009 and prepared by Web, indicates that response actions conducted at the site have included in-situ bioremediation. Further, the report indicates that a Method 3 Risk Assessment is being evaluated to achieve a Response Action Outcome for the release site.

Based upon the apparent downgradient direction of this site with respect to the subject site and response actions currently being conducted by Web, it does not appear likely that this site poses a threat of impact to the subject site.

181 Spencer Street, RTN 3-23166

This release site is located approximately 200 feet to the southwest and downgradient of the subject site. Reportedly, petroleum contamination was encountered at this site during the removal of a 10,000 gallon fuel oil UST. DEP approved Immediate Response Actions that were conducted at the site, which included the removal of over 500 tons of petroleum contaminated soil and 150 gallons of groundwater. A Class A-2 Response Action Outcome (RAO) was filed at the DEP on January 12, 2004 indicating that a permanent solution has been achieved for the release and that "No Significant Risk" exists at the site. Given that this site is located downgradient from the subject site and a Permanent Solution has been achieved for the release, this site is not considered to pose a threat of impact to the subject site.

EMTEX, 181 Spencer Street, RTN 3-3671

This release site is located approximately 200 feet to the southwest of the subject site. Based on a review of reports pertaining to this release, the direction of groundwater flow at the site is to the southeast. According to the DEP on-line waste site database, a release of petroleum to groundwater was reported the DEP on July 15, 1991.

According to Goldman Environmental, low levels of petroleum constituents were detected in soil and groundwater which were attributed to incidental historical spills at this site. Based on the concentrations of petroleum constituents detected in soil and groundwater, Goldman completed a Class B-1 RAO for the release in May of 2007. However, the DEP on-line database does not indicate the submittal of an RAO for this release site. Given that this release site is downgradient from subject site, it is not considered to pose a threat of impact to the subject site.

Vacant Lot, 315 Crescent Street, RTN 3-10222

This site is located about 600 feet to the southeast of the subject site at an apparent downgradient direction with respect to the subject site. According to the DEP on-line waste site database, a release of diesel fuel was reported to the DEP on November 24, 1993 from a UST located at the site. In addition, the DEP database indicates that a Class A-3 RAO and an Activity and Use Limitation (AUL) was filed for the release on November 25, 1994. Given that a Permanent Solution was achieved for this site and that the site is located downgradient from the subject site, this release is not considered to pose a threat of impact to the subject site.

Summary of Soil Chemical Testing

During a subsurface investigation performed at the site in July 2009, selected soil samples obtained from three completed borings were submitted to a laboratory for chemical analysis. A total of five (5) soil samples were analyzed for the presence of VOCs and four (4) soil samples were analyzed for the presence of semi-volatile organic compounds (SVOCs). VOCs and SVOCs were also analyzed from a composite sample obtained from borings B-201/B-202/B-203 as part of the disposal characterization, which is discussed below. Chemical test results of soil samples are summarized in **Table 1**.

The results of the analysis indicated that VOCs were not detected above the laboratory method detection limits in the analyzed samples, with the exception of p/m-xylene, tetrachloroethene and toluene. Specifically, p/m-xylene and toluene were detected in sample B-201/B-202/B-203 at concentrations of 0.31 milligrams per kilogram (mg/kg) and 0.42 mg/kg, respectively, which are well below the RCS-1 reporting thresholds of 500 mg/kg and 30 mg/kg. Further, tetrachloroethene was detected in sample B-203, sample S-1 at a concentration of 0.09 mg/kg, which is below the RCS-1 reporting threshold of 1 mg/kg.

With the exception of benzo(a)pyrene, testing did not detect the presence of SVOCs at concentrations above the laboratory method detection limits and/or the applicable RCS-1 reporting thresholds. Benzo(a)pyrene was detected in sample B-203 S-1/S-2 comp at a concentration of 2 mg/kg, which is equal to the RCS-1 reporting standard. However, given the presence of ash and cinders observed in the sample, the detected concentration is considered to be exempt from reporting to the Massachusetts DEP.

Analysis for the presence of the RCRA-5 metals did not detect any of the five metals at concentrations above the applicable RCS-1 reporting standards. In addition, levels of PCBs were not detected above the laboratory method detection limits, which are well below the RCS-1 reporting standard.

The results of TPH analysis indicated that petroleum hydrocarbons were detected at a concentration of 1,060 mg/kg, which is above the RCS-1 reporting standard of 1,000 mg/kg. Due to the elevated TPH result, the sample was analyzed for the presence of extractable petroleum hydrocarbons (EPH) fractions. The results of analysis indicated that the EPH fractions, C9-C18 Aliphatics, C19-C36 Aliphatics and C11-C22 Aromatics were not detected above the applicable RCS-1 reporting standards. Therefore, a reportable release of petroleum as defined in the Massachusetts Contingency Plan (MCP) has not been identified.

Summary of Groundwater Chemical Testing

In July 2009, McPhail Associates, Inc. obtained a groundwater sample from observation wells, B-101(OW), B-201 (OW), B-203 (OW) and MW-2 at the subject site. The four (4) groundwater samples were analyzed for the presence of VOCs. The location of the observation wells are shown on **Figure 2** and the chemical test results of these groundwater samples are summarized in **Table 2**.

The results of the analysis indicate that, with the exception of acetone, VOCs were not detected above the laboratory method detection limits. Specifically, acetone was detected in the groundwater sample obtained from monitoring well B-203 (OW) at a concentration of 0.011 milligrams per liter (mg/l), which is well below the RCGW-2 reporting standard of 50 mg/l.

On September 25, 2009, McPhail Associates, Inc. obtained a sample of groundwater from observation well B-203(OW) which was submitted to a certified laboratory and chemically analyzed for the presence of compounds required under the EPA's Remediation General Permit (RGP) application, including pH, total suspended solids (TSS), total residual chlorine, total petroleum hydrocarbons (TPH), cyanide, volatile organic compounds (VOCs) including total benzene, toluene, ethylbenzene and xylenes (BTEX), poly-aromatic hydrocarbons (PAHs) and semi-volatile organic compounds (SVOCs) including total phenols and total phthalates, pesticides and PCBs, and total recoverable metals.

Chemical test results are summarized in **Table 3**, and laboratory data is included in **Appendix E**. The results of chemical testing indicate the following:

1. **pH:** The tested sample exhibited a pH level of 6.1 Standard Units (S.U.) which is slightly below the recommended range of 6.5 to 8.5 S.U. for discharge into saltwater. As a result of the low pH detected in the groundwater sample, daily pH monitoring of the influent will be performed. During periods where pH is detected below the recommended 6.5 S.U. for discharge into a saltwater body, pH treatment compounds such as soda ash will be added to the settlement tank as necessary to raise the level of pH to within the recommended range for discharge into a salt water body.

2. **TSS:** Total suspended solids (TSS) was not detected in the tested sample at a concentration in excess of the laboratory method detection limit of 5 milligrams per liter (mg/l). The limit established by the US EPA for discharge into surface water is 30 mg/l. However, it is likely that construction activities associated with the proposed site development will cause concentrations of TSS in the influent to fluctuate which will require mitigation. As a result, groundwater will be pre-treated by passing the water through one (1) 5,000 gallon sediment settling tank prior to discharge in order to reduce the concentration of TSS in the effluent.

3. **VOCs:** The groundwater sample indicated no detected level of any of the target VOCs, including BTEX.

4. **TPH:** Chemical analysis of the groundwater sample indicated no detectable levels of TPH.

5. **PAHs and SVOCs:** The laboratory reported no detectable levels of Group 1 or Group II PAH, pentachlorophenol, total phenols, no bis(2-ethylhexyl)phthalate and total phthalates.

6. **PCBs:** The laboratory results indicated no detectable levels of PCBs.

7. **Cyanide:** Cyanide was not detected in the tested groundwater sample at a concentration in excess of the laboratory method detection limit of 0.5 mg/l.

8. **Total Metals:** The laboratory reported no detectable levels of antimony, chromium III, chromium VI, mercury, silver and zinc. Levels of arsenic, cadmium, copper, lead, nickel, selenium, and iron were reported at levels of 0.5 ug/l, 0.3 ug/l, 1.1 ug/l, 1.6 ug/l, 1.0 ug/l, and 80 ug/l, respectively. All of these results are below the RGP permit limits for discharge to salt water.

   Calculations of the mass of these compounds are included in **Table 4**.

In summary, the tested sample from observation well B-203(OW) did not exhibit the presence of a sheen or visual and/or olfactory evidence of contamination. The results of the groundwater chemical analyses indicate that none of the analytes were detected at concentrations in excess of the applicable MCP risk-based cleanup standards for groundwater category GW-3 that are protective of surface water and the environment. However, the sample did exhibit a level of pH at 6.1 S.U. which is slightly below the recommended range of 6.5-8.5.

Construction Dewatering

It is anticipated that dewatering will be required for construction of the proposed building foundation. In addition, rainwater is anticipated to accumulate within localized trenches after periods of heavy precipitation. It is anticipated that dewatering by means of strategically located sumps and trenches should suffice during foundation construction operations.

It is estimated that the typical continuous groundwater discharge required during the foundation construction will be on the order of 35 to 50 gallons per minute (GPM). This estimate of discharge does not include surface runoff which will be removed from the excavation during the limited duration of a rain storm and shortly thereafter.

Construction dewatering will require the discharge of collected groundwater into the storm drain system under the requested Dewatering General Permit. A review of available plans provided by the City of Chelsea indicate that dedicated storm drains are located beneath Webster Avenue and Eastern Avenue which are located to the southwest and east of the subject site, respectively. Specifically, the 12-inch dedicated storm drain located beneath Webster Avenue flows southeast and connects to a 15-inch drain beneath Eastern Avenue. The 15-inch storm drain, that runs from north to south along Eastern Avenue, flows south and increases in size to 18-inches before connecting to a 42-inch box culvert beneath the intersection of Eastern Avenue and Willoughby Street. The 42-inch culvert flows southeast and eventually discharges into the Chelsea Creek, a Class SB water body, at outfall location CH008. The location of the relevant catch basins with relation to the subject site are indicated on **Figure 2**. The flow path of the discharge is shown in plans provided by the City Chelsea which are included in **Appendix F**.

Groundwater Treatment

The sample tested from observation well B-203 (OW), exhibited a level of pH at 6.1 S.U. which is slightly below the recommended range of 6.5-8.5 S.U. Based on our knowledge of foundation construction, the flow of groundwater over cementious materials, such as placed concrete footings, prior to dewatering increases the level of pH. Therefore, given the scope of construction proposed at the site, it is our opinion that pH of the effluent may fluctuate and will likely be greater than the pH initially detected in B-203(OW). However, to ensure pH of the effluent does meet the EPA standards for discharge into salt water, daily pH monitoring of the effluent will be implemented and pH treatment compounds such as soda ash will be utilized as necessary to achieve a level of pH within the EPA recommended range for discharge into salt water.

In addition, given the proposed scope of development, which includes excavation for footings, it is our opinion that a sedimentation tank will be required to settle particulate matter out of the effluent to meet allowable total suspended solids (TSS) discharge limits established by the US EPA and Massachusetts DEP prior to discharge. A sedimentation tank, 5,000-gallons in capacity, will be incorporated into the discharge system in order to meet allowable discharge limits for TSS established by the DGP.
A schematic of the treatment system is shown on **Figure 3**.

To document the effectiveness of the above treatment system, samples of the discharge water will be obtained and tested for the presence of TSS and pH prior to the start of discharge into the storm drain system. Should the pre-start up testing indicate that the levels of TSS and pH in the effluent from the settling tank exceed the limits established under the DGP, additional filtration and treatment of the effluent will be implemented prior to discharge.

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Should the results of testing for TSS and pH continue to indicate an exceedance of the DGP limit parameters appropriate treatment will be implemented. In addition, should other contaminants be detected within the discharge water during the construction dewatering phase of the project at levels that exceed the effluent limitations, mitigative measures will be implemented to meet the allowable discharge limits.

Summary and Conclusions

The purpose of this report is to assess site environmental conditions and groundwater data to support an application for a Massachusetts Dewatering General Permit for off-site discharge of groundwater which will be encountered during construction at the Spencer Row Housing project located at 205 Spencer Avenue in Chelsea. It is understood that groundwater testing results reported in this application have been provided to the site owner.

Based on the results of groundwater chemical analyses discussed above, it is our opinion that groundwater quality meets the DEP and the EPA requirements for discharge into a Class SB Surface Water Body without any special treatment. In order to ensure that the levels of TSS and pH in the effluent meet the terms of the discharge permit, a sedimentation settling tank system will be utilized to settle particulate matter out of the water prior to discharge. In addition, based on the results of groundwater analysis, daily pH monitoring of the effluent will be implemented and pH treatment compounds will be utilized as necessary to achieve a level of pH within the EPA recommended range for discharge into salt water. A sample of the effluent will be obtained prior to discharge to document that the sediment removal system has addressed levels of TSS, and pH. However, should the effluent motoring results indicate a level of TSS in excess of the limits established in the Massachusetts Dewatering General Permit, additional filtration, such as a bag filter, will be installed. In addition, if pH levels exceed the DGP permit limits a specialized pH balancing system will be implemented.

We trust that the above satisfies your present requirements. Should you have any questions or comments concerning the above, please do not hesitate to contact us.

Very truly yours,

McPHAIL ASSOCIATES, INC.

William J. Burns

Peter J. DeChaves L.S.P.

Enclosures

F:\WP5\REPORTS\4967-DGP Application.wpd
WJB/pjd

FIGURE 1

McPHAIL ASSOCIATES, INC
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617/868-1420
617/868-1423 (Fax)

N

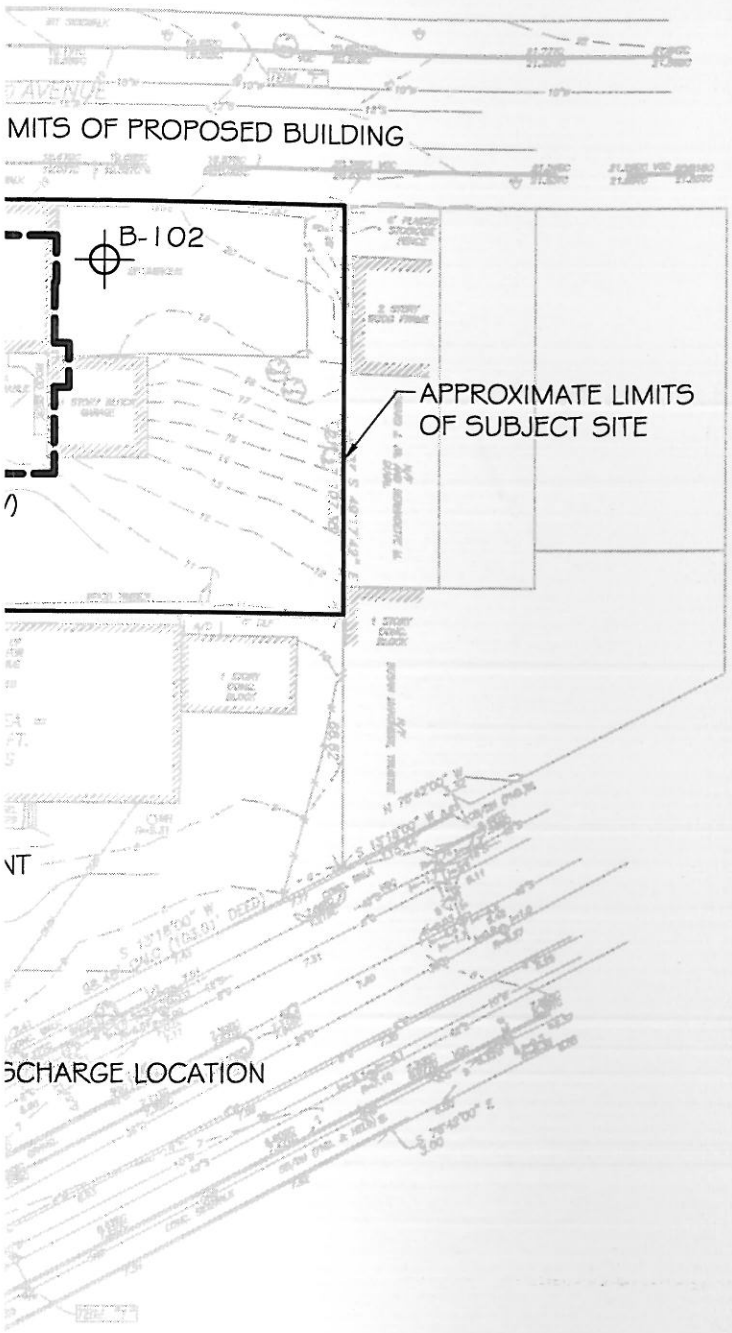
SCALE 1:25,000

PROJECT LOCATION PLAN

SPENCER ROW

CHELSEA MASSACHUSETTS

FIGURE 2



NORTH

LEGEND

- ⊕ — LOCATION OF BORING PERFORMED BY CARR-DEE CORP. ON JULY 2 AND 3, 2009 FOR McPHAIL ASSOCIATES, INC.
- ⊕ — LOCATION OF BORING PERFORMED BY CARR-DEE CORP. FROM AUGUST 29 TO AUGUST 31, 2007 FOR McPHAIL ASSOCIATES, INC.
- ⊕ — APPROXIMATE LOCATION OF EXISTING MONITORING WELL INSTALLED BY IRWIN ENGINEERS
- (OW) — INDICATES OBERVATION WELL INSTALLED WITHIN COMPLETED BOREHOLE

REFERENCE: THIS PLAN WAS PREPARED FROM A 20-SCALE DRAWING ENTITLED, "EXISTING CONDITIONS SURVEY" DATED FEBRUARY 14, 2007 BY FELDMAN PROFESSIONAL LAND SURVEYORS AND A 30-SCALE DRAWING ENTITLED, "SITE UTILITY PLAN" DATED APRIL 29, 2009 PREPARED BY NITSCH ENGINEERING

GRAPHIC SCALE

50 0 50 100

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SPENCER ROW

CHELSEA MASSACHUSETTS

SITE AND DISCHARGE LOCATION PLAN

FOR

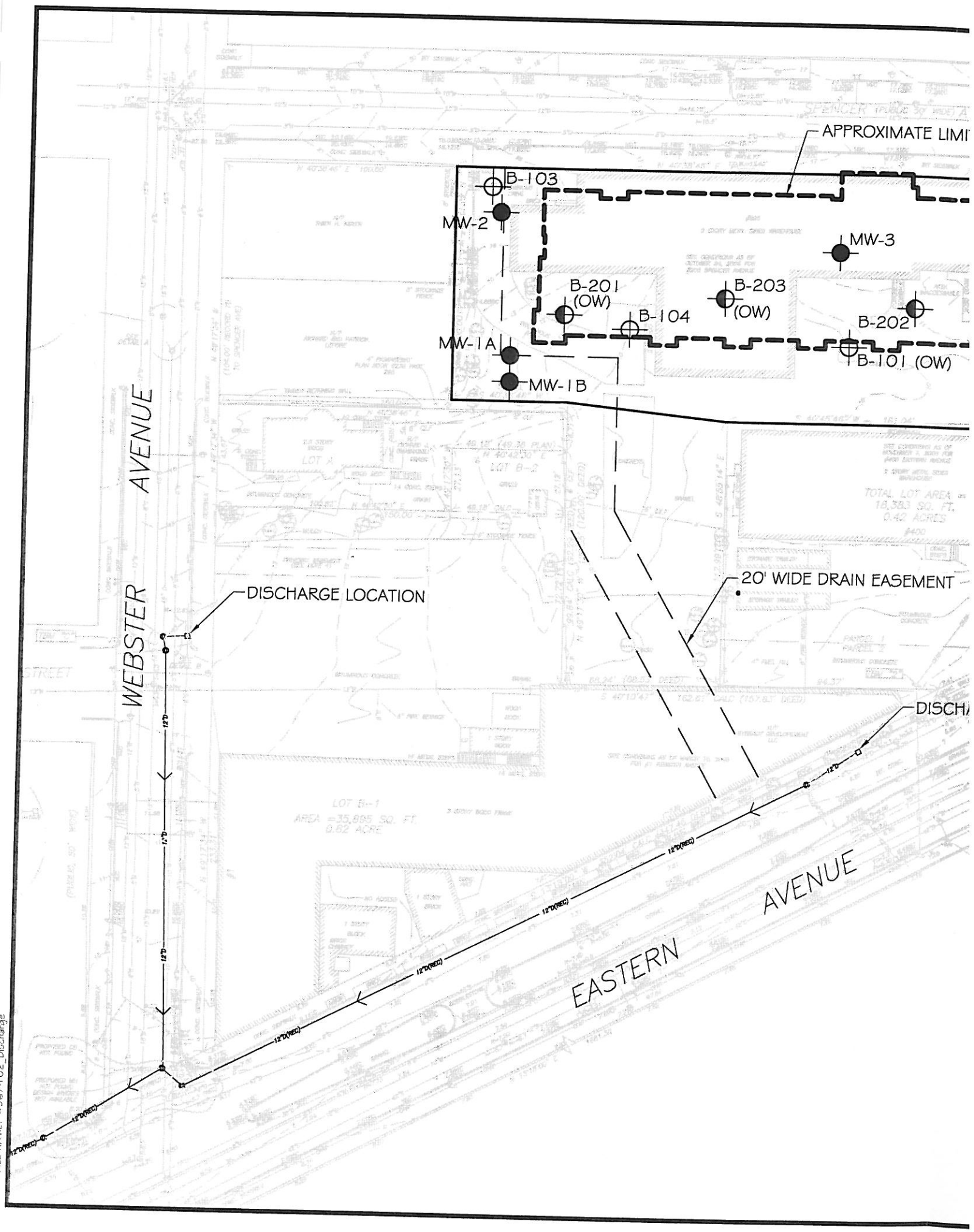
CHELSEA NEIGHBORHOOD DEVELOPMENT

BY

McPHAIL ASSOCIATES, INC.

CONSULTING GEOTECHNICAL ENGINEERS

Date: OCTOBER 2009	Dwn: M.B.S.	Chkd: P.J.D.	Scale: 1" = 50'
Project No: 4967			



FILE NAME: 4967-F02_Discharge