

APPENDIX L
OPEN SPACE DESIGN STANDARDS
FOR THE
BAYFRONT REDEVELOPMENT

JERSEY CITY, NJ

Prepared for

Honeywell

101 Columbia Road
Morristown, New Jersey 07962

Prepared by



AMEC Environment & Infrastructure, Inc.
200 American Metro Boulevard, Suite 113
Hamilton, New Jersey 08619

JUNE 2013
ISSUED FOR CONSTRUCTION

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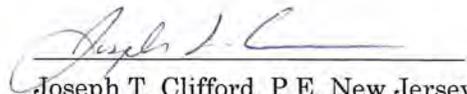
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**JUNE 2013
REVISION 0**



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1.0 INTRODUCTION

1.1 APPLICABILITY

A. Federal Court Orders. These Open Space Design Standards (OSDS) have been adopted pursuant to two federal court orders. These orders are formally titled the *First Amended Consent Decree Regarding Remediation and Redevelopment of Study Area 6 North* (“*Study Area 6 North Consent Decree*”) ECF No. 435 (August 2, 2012) and the *First Amended Consent Decree Regarding Remediation and Redevelopment of Study Area 6 South* (“*Study Area 6 South Consent Decree*”) ECF No. 434 (August 2, 2012). Both orders have been entered by the United States District Court for the District of New Jersey in consolidated litigation referred to as *Jersey City Municipal Utilities Authority et al. v. Honeywell International Inc.*, Civ. No. 05-5955 (also consolidated with *Interfaith Community Organization v. Honeywell International Inc.*, Civ. No. 95-2097). The court orders provide for the remediation of chromium contamination, through the installation of an engineered cap, and for the development of open space parks over the cap. The court orders also require the establishment of Open Space Design Standards that protect the integrity of the Chromium Remedy.

B. Central Park and Promenade. The OSDS apply to the open spaces known as “Central Park” and “Promenade” in the Bayfront Redevelopment Plan and collectively referred to as the Open Spaces Areas. Concept architectural renderings for the Open Spaces (or Open Space Areas) are provided in the Bayfront Redevelopment Plan (dated February 13, 2008). The Bayfront Redevelopment Plan was adopted by the City of Jersey City Planning Board on March 12, 2008. The approximately 100 acre Bayfront Redevelopment Plan envisions a mixed-use, new urbanism development readily accessible to mass transportation and consisting of residential, commercial, retail, professional office, institutional and integrated recreational land use. Recreational open space use totals approximately 25 acres of park space including Central Park (~11 acres) and the Promenade (~8 acre) (see Figure 1). These Open Space Design Standards do not apply to any other open or green space in the Bayfront Redevelopment Plan.

C. Compliance Required. Compliance with the OSDS is required by the federal court orders, and is mandatory for all planning, development, and maintenance of the Open Space Areas regardless of when undertaken.

Under the Study Area 6 North and Study Area 6 South Consent Decrees, the OSDS may be developed in phases. The standards contained herein may be supplemented in the future with additional standards.

Compliance with the OSDS does not replace the obligation to comply with all applicable Jersey City standards, requirements, and ordinances. Compliance with the OSDS is required in addition to compliance with all applicable Jersey City standards, requirements, and ordinances.

D. Protection of Chromium Remedy. The OSDS set forth requirements intended to protect the Chromium Remedy as it was engineered and installed as described in the 100% Design. All Permissible Development Elements must satisfy these standards, the Consent Decrees, and the conservation restrictions for the Open Space Areas (ECF Nos. 249 and 363 in Civ. No. 05-5955). However, the standards are not intended to restrict the selection and variety of Permissible Development Elements. For example, these standards do not require selection of a particular style of lighting fixture. A variety of lighting fixtures may be selected as long as the fixtures satisfy the requirements of these standards, such as those regarding bearing pressure.

E. Organization. Section 1 identifies the pertinent legal and regulatory documents governing the OSDS and provides some background information on relevant aspects of the Chromium Remedy. Section 2 establishes specific criteria for the Permissible Development described in the Consent Decrees. Section 3 provides criteria governing the documentation of development undertaken in the Open Space Areas.

F. References to Consent Decrees. Notwithstanding differences in details of the Study Area 6 North and Study Area 6 South Open Space Area remedies, the requirements related to the OSDS are identical between the two Consent Decrees. The paragraph numbering for specific sections differs between the two documents. For example “Prohibited Development” is described in Paragraph 60(j) for Study Area 6 North and 74(j) for Study Area 6 South. For the purposes of this document the requirements will be referenced to the numbering used in the Study Area 6 North Consent Decree. Unless specifically noted, that requirement is deemed to apply to the corresponding paragraph in the Study Area 6 South Consent Decree.

Attachment A provides a cross reference of the relevant paragraph numbering from the two Consent Decrees.

1.2 DEFINITIONS

Terms used in the OSDS have the meanings set forth in the Study Area 6 North and Study Area 6 South Consent Decrees, and the definitions set forth therein are incorporated into the OSDS by reference. In addition, the following definitions apply to these OSDS:

1. **100% Design** shall mean the design documents approved and entered as an order of the Court pursuant to Paragraph 72(f) of the Study Area 6 North Consent Decree or Paragraph 86(g) of the Study Area 6 South Consent Decree, including the drawings and Technical Specifications, and any Court-approved amendments thereto. References herein to Technical Specifications are to those that are part of the 100% Design.
2. **Bayfront Redevelopment Plan** shall mean the development plan adopted by Jersey City on March 12, 2008.
3. **Bedding Material** shall mean the granular soil (sand or crushed stone) placed beneath the utility or structure.
4. **Canopy** shall mean the total area comprised of the drip-line diameter of the trees.
5. **Cap** shall mean the base protective layer, an impervious geomembrane liner; a geocomposite drainage layer, a filter fabric and a distinctive colored warning layer with markings in English and Spanish as described in the 100% Design. The geocomposite drainage layer also serves as the warning layer.
6. **City Engineer** shall mean the Office of the City Engineer for the City of Jersey City.
7. **Consent Decree(s)** shall mean the First Amended Consent Decree Regarding Remediation and Redevelopment of Study Area 6 North (Study Area 6 North Consent Decree)(ECF No. 435) and/or the First Amended Consent Decree Regarding Remediation and Redevelopment of Study Area 6 South (Study Area 6 South Consent Decree)(ECF No. 434), which were both entered by the United States District Court for the District of New Jersey on

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August 2, 2012 in *Jersey City Municipal Utilities Authority v. Honeywell International Inc.*, Civ. No. 05-05955 (consolidated with Civ. Nos. 05-05993 and 0622).

8. **Court or Federal Court** shall mean the United States District Court for the District of New Jersey.
9. **Development Plan** shall mean the plan required by the Study Area 6 North Consent Decree Paragraph 60(j)(vi) and the Study Area 6 South Consent Decree Paragraph 74(j)(vi).
10. **Excavation** shall mean any digging activity including plant installation and plant maintenance activities. See also the definition of Intrusive Excavation.
11. **Fill** shall mean the soils or other fill material above the Warning Layer/Liner. The term Fill shall also mean soil and vice versa.
12. **Final Development Grade** shall mean the site surface grades shown in the As-Built drawings created as of the conclusion of the Initial Development Period as set forth in Sections 2.1.3 and 3.1.
13. **Fill Depth** shall mean the Fill or soil depths above the Warning Layer/Liner as set forth in Figures 4 B through D, and G through I, but no greater than the maximum Fill or soil depths set forth in Section 2.1.3.A.
14. **Furnishings** shall mean pedestrian benches, trash receptacles, bollards, kiosks, bus stop sheds, bicycle racks, decorative fencing, signs or other permanent fixtures or amenities.
15. **Geocomposite Drainage Layer Cover Soil** shall mean the nominal 12 inch protective soil cover immediately above the Geocomposite Drainage Layer.
16. **Hardscape Areas** shall mean those areas of the Open Space Areas that are not Roadways or Landscaped Acreage.
17. **Honeywell Groundwater Treatment Plant** shall mean the groundwater treatment plant maintained and operated by Honeywell pursuant to the Deep Overburden and Bedrock Groundwater Remedies Consent Order, which was entered by the United States District Court for the District of New Jersey in *Interfaith Community Organization v. Honeywell International Inc.*, Civ. No.

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- 95-2097 (consolidated with Civ. Nos. 05-5955, 05-5993, and 06-22) ECF No. 898 (September 3, 2008).
18. **Initial Development** shall mean the development undertaken pursuant to paragraph 60(j) (ii) of the Study Area 6 North Consent Decree and paragraph 74(j) (ii) of the Study Area 6 South Consent Decree.
 19. **Initial Development Period** shall mean the period defined in paragraph 60(j) (ii) of the Study Area 6 North Consent Decree and paragraph 74(j) (ii) of the Study Area 6 South Consent Decree.
 20. **Intrusive Excavation** shall mean any excavation one foot or greater in depth from the ground surface or any excavation within one foot of the Warning Layer/Liner, except for hand-digging unless hand-digging comes within one foot of the Warning Layer/Liner.
 21. **Landscape Element** shall mean an individual landscape item, such as a tree or shrub.
 22. **Landscaped Acreage** shall mean the total acreage of the Open Space Area devoted to landscaping.
 23. **Landscaped Area** shall mean any area included in the Landscaped Acreage.
 24. **Liner** shall mean the geomembrane liner component of the Cap. For purposes of the OSDS, the Warning Layer is deemed to have the same elevation as the Liner.
 25. **Maintenance Equipment** shall mean vehicles that are permitted in the Landscape and Hardscape Areas based on compliance with the ground pressure requirements set forth in Section 2.1.4.D.
 26. **Master Intrusive Excavation Plan** shall mean the plan required by Section 2.1.1.F.
 27. **Open Space Area(s)** shall mean the Area of Concern (AOC) 1 Open Space Area as defined in the Study Area 6 North Consent Decree and referred to as “Central Park” in the Bayfront Redevelopment Plan and the Open Space AOC as defined in the Study Area 6 South Consent Decree and referred to as the “Promenade” in the Bayfront Redevelopment Plan.
 28. **Pedestrian Thoroughfare/Way** shall mean the paved walkway that runs from Kellogg Street in the south to the Transit Plaza in the north as shown on page 64 of the Bayfront Redevelopment Plan.

29. **Perimeter Hydraulic Barrier** shall mean the walls that form the borders of the Open Space Areas which consist of the Soil/Cement/Bentonite Walls on the south side of the Study Area 6 North Open Space Area and the north side of the Study Area 6 South Open Space Area and the Steel Sheetpile walls on the remaining sides of the Open Space Areas.
30. **Permissible Development** shall mean those items that are permitted under Paragraph 60(k) of the Study Area 6 North Consent Decree and 74(k) of the Study Area 6 South Consent Decree.
31. **Permissible Development Element** shall mean an individual Permissible Development item other than a Landscape Element, such as a single recreational facility or a single street light.
32. **Prohibited Development** shall mean that development which is prohibited by Paragraph 60(j) of the Study Area 6 North Consent Decree or Paragraph 74(j) of the Study Area 6 South Consent Decree.
33. **Root Barrier** shall mean a woven polypropylene geotextile similar or equal to Belton Industries 1104.
34. **Root Barrier Horizon C Soils** shall mean the first 6 inches of Horizon C soils directly above the Root Barrier that are compacted as required by Section 2.1.2.D.3. These soils are included as part of the layer of Horizon C Soils set forth in Technical Specification 2315 and Drawings CN301 and C301 of the 100% Design but are not identified or labeled in those materials as Root Barrier Horizon C Soils.
35. **Roadway** shall mean the road and its associated curbing. Permanent Roadway shall mean the roads depicted on page 39 of the Bayfront Redevelopment Plan.
36. **Warning Layer** shall mean the clearly visible, distinctive colored layer with both English and Spanish warning labels as required by Paragraph 56(a) of the Study Area 6 North Consent Decree or Paragraph 65(a) of the Study Area 6 South Consent Decree. For purposes of the OSDS the Warning Layer is deemed to have the same elevation as the Liner.

1.3 GOVERNING DOCUMENTS

The following documents shall also be consulted and considered in the planning, development, construction, and maintenance of the Open Space Areas:

A. The Study Area 6 North and Study Area 6 South Consent Decrees.

Both decrees were entered by the United States District Court for the District of New Jersey in *Jersey City Municipal Utilities Authority v. Honeywell International Inc.*, Civ. No. 05-05955 (consolidated with Civ. Nos. 05-05993 and 06-22). The Consent Decrees are entitled: *First Amended Consent Decree Regarding Remediation and Redevelopment of Study Area 6 North* (ECF No. 435, August 2, 2012) and *First Amended Consent Decree Regarding Remediation and Redevelopment of Study Area 6 South* (ECF No. 434, August 2, 2012). The Consent Decrees are available from Honeywell and the Federal Court.

B. The Chromium Remedy as set forth in the 100% Design and the As-Built Documentation.

The 100% Design includes the design documents approved and entered as an order of the Court pursuant to Paragraph 72(e)(i) of the Study Area 6 North Consent Decree or Paragraph 86(e)(i) of the Study Area 6 South Consent Decree. The Chromium Remedy designs for both Study Area 6 North and Study Area 6 South are also addressed in the final Remedial Action Report and supporting “as-built” documentation required by Paragraph 72(c) (vii) of the Study Area 6 North Consent Decree and Paragraph 86(c)(xvii) of the Study Area 6 South Consent Decree. The 100% Design and As-Built Documentation for the Chromium Remedy are available from Honeywell, the Federal Court, and the City Engineer.

C. The Bayfront Redevelopment Plan approved March 12, 2008, and specifically Section 4 Mobility and Section 6 Landscape Plan. This plan is available from Honeywell, the City Engineer and the Jersey City Redevelopment Authority.

D. The Open Space Design Standards. Additional Open Space Design Standards may be developed in conjunction with the preparation of the Development Plans for the Initial Development of each Open Space Area. Such additional standards will be incorporated into these standards and re-published as an amendment to the 100% Design. The OSDS as modified are available from Honeywell, the Federal Court and the City Engineer.

E. The Conservation Restrictions. Pursuant to Consent Decrees, a conservation restriction was recorded for each of the Open Space Areas. The

conservation restrictions were also entered as orders of the Court, ECF Nos. 249 and 363.

1.4 GENERAL DESCRIPTION OF THE CHROMIUM REMEDIES

The Chromium Remedies for the Open Space Areas consist of the following general components described in this section. For more specific design details, consult the 100% Design documents and “As-built” Documentation for each respective Chromium Remedy. A schematic of the Chromium Remedy is shown in Figure 2.

In general, the Chromium Remedies consist of two components.

- Soil Remedy
 - Resource Conservation and Recovery Act (RCRA) Cap
- Shallow Groundwater Remedy
 - Perimeter Hydraulic Barrier
 - Pump and Treat contingent system, which consists of:
 - Groundwater recovery wells
 - Paired piezometers to measure conformance with the negative gradient requirement stipulated in the Consent Decree
 - Utilities in the form of electrical and instrumentation wiring and discharge piping

A schematic of the cap system detail is shown in Figure 3.

Figure 2: Chromium Remedy Schematic

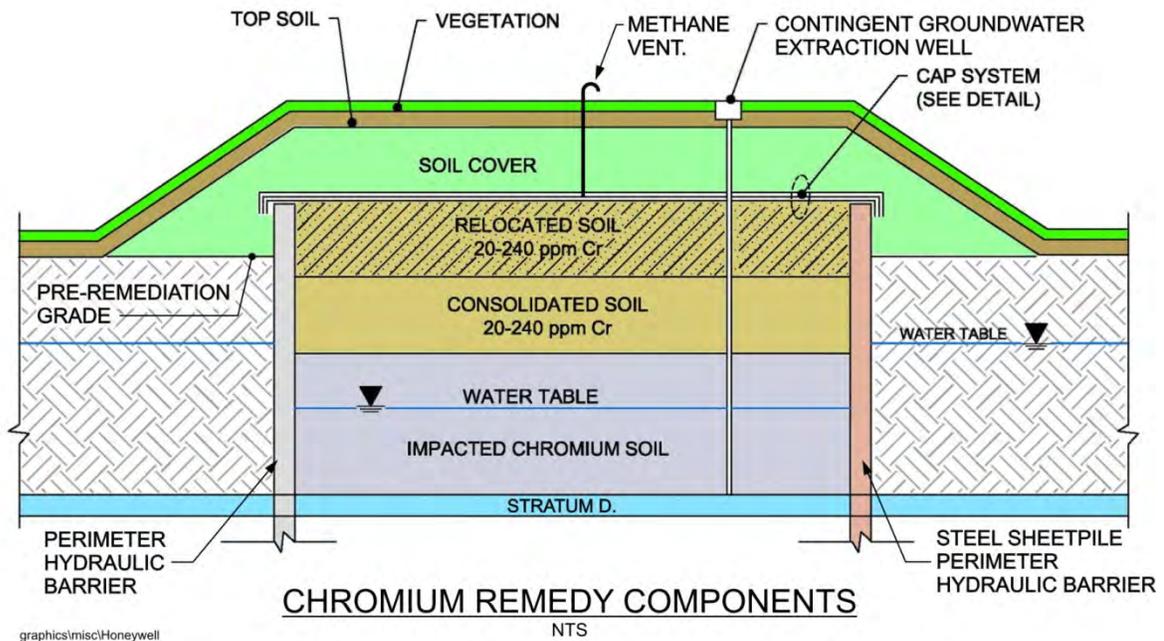
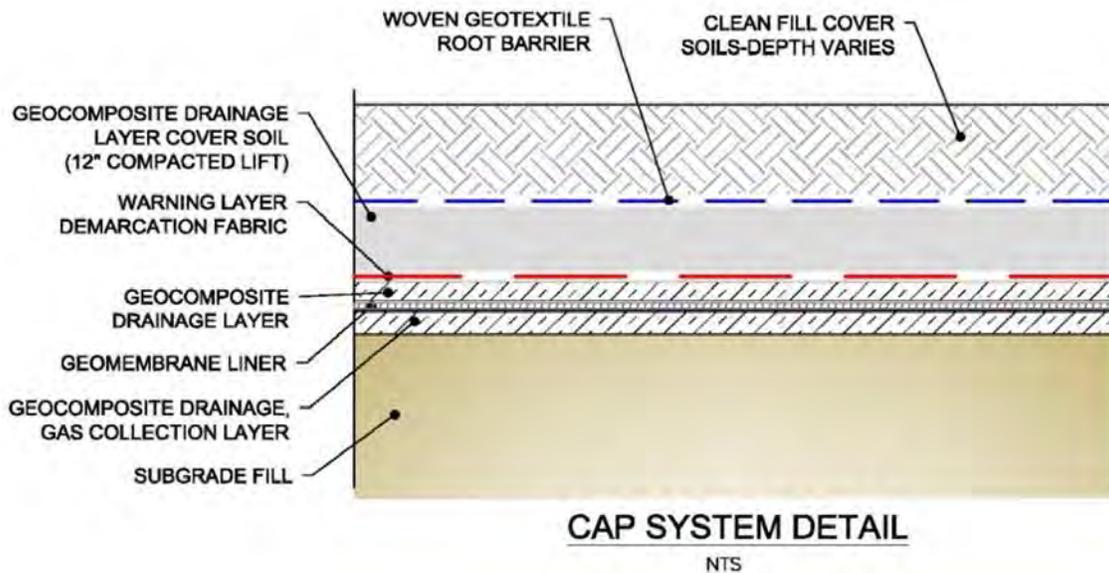


Figure 3: Cap System Detail



1.5 PERMISSIBLE DEVELOPMENT AND OPEN SPACE AREA USES

The Bayfront Redevelopment Plan incorporates two major parks to be developed over the Chromium Remedies in the Open Space Areas. Pursuant to the Study

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Area 6 North Consent Decree and the Study Area 6 South Consent Decree, the Open Space Areas may include any or all of the following types of development features or facilities, **provided that such features satisfy the conditions set forth in the design criteria contained in Section 2:**

- (i) roads and pedestrian thoroughfares-- both crossing and running along the Open Space areas, but no more extensive than provided for in Page 39 of the Bayfront Redevelopment Plan;
- (ii) curbing and fences;
- (iii) sidewalks, paths, walkways, and nature trails;
- (iv) utilities and utility corridors, lighting and restrooms;
- (v) irrigation or sprinkler components or systems;
- (vi) water features;
- (vii) above ground storm water cisterns;
- (viii) signs, including signs informing visitors of the history of chromium production, contamination, and remediation;
- (ix) benches, trash receptacles, and bicycle racks;
- (x) recreational facilities, such as playground equipment, bocce ball courts, tennis courts, basketball courts, and athletic fields, and
- (xi) landscaping, including natural grasses, small trees, shrubbery, and potted plants, provided that such landscaping, and the anticipated root structure of each landscaping component do not and will not jeopardize the integrity of the Chromium Remedy.

Other uses of the Open Space Areas are expressly prohibited. All Permissible Development must comply with the Open Space Design Standards set forth in Section 2.

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The Consent Decrees include specific requirements for protection of the Cap that are expressly incorporated into the Open Space Design Standards as follows:

- Paragraph 60 of the Study Area 6 North Consent Decree sets out the framework for requirements intended to protect the chromium remedy.
- Paragraph 56 of the Study Area 6 North Consent Decree defines the minimum standards for cap components and thickness of cover soils.
- The Consent Decrees recognize that certain types of development are not compatible with the RCRA-type cap. Paragraph 60(j) of the Study Area 6 North Consent Decree addresses Prohibited Development and establishes specific criteria for the Permissible Development and defines acceptable types of development features or facilities.
- Seventy five percent (75%) of the Open Space Area exclusive of the acreage used for roads and the pedestrian thoroughfare shall be comprised of landscaping as defined in Paragraph 60(k) (xi) of the Study Area 6 North Consent Decree.

These Consent Decree requirements, and the corresponding requirements in the Study Area 6 South Consent Decree, are expressly incorporated into the OSDS and must be complied with in the development of the Open Space Areas. This section provides additional requirements which must be met in future development of the Open Space Areas.

2.1 STANDARDS APPLICABLE TO ALL PERMISSIBLE DEVELOPMENT

2.1.1 *Excavations and Protection of the Cap from Penetrations*

A. Protection of the Cap. Except as provided in this section, the Cap shall not be intentionally penetrated or breached. If breached, all repairs of the Cap shall be conducted in accordance with the 100% Design Technical Specifications Section 02372, Cap Geomembrane Liner, Paragraph 3.07, and sub-paragraphs G – H.

B. Protection of the Perimeter Hydraulic Barrier. No Permitted Development Element shall penetrate, breach, or impair the Perimeter Hydraulic

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Barrier, unless measures designed to maintain the integrity of the Perimeter Hydraulic Barrier have been certified by a licensed New Jersey Professional Engineer and incorporated into a Development Plan which has been reviewed and approved by the Special Master or the Federal Court. No penetration or breach shall be certified or approved unless it is demonstrated that the designed measures shall maintain the integrity of the Perimeter Hydraulic Barrier and shall not jeopardize the integrity of the Chromium Remedy.

C. General Prohibition on Excavation Except in Compliance with OSDS.

Excavation is prohibited in the Open Space Areas, except to the extent necessary to construct, install, repair, inspect, or otherwise maintain Permissible Development and the Chromium Remedies. Excavation in the Open Space Areas is permitted only if in compliance with these Standards.

D. Criteria for Excavation. To the extent that Excavation is required, the following criteria apply:

1. Machine excavation is prohibited within one foot of the Warning Layer/Liner. Soft digging methods shall be used within one foot of the Warning Layer/Liner. Soft digging methods include hand excavation and use of equipment such as air knives.
2. Use of augers for excavation, including for planting, is prohibited.
3. In any excavation in Roadways, the Roadway and its underlying Fill shall be re-established to pre-excavation conditions.
4. In any excavation in Landscaped Areas, compliance with Section 2.2.9 is also required.
5. In any excavation in Landscaped and Hardscape Areas, reasonable effort shall be made to minimize the mixing of the various soil types and follow the last out/first in principle where the last soils excavated are the first soils returned to the excavation so that the Fill is replaced in the same layering as depicted in the 100% Design and the Final Development Grade. In all instances where applicable, the Root Barrier Horizon C Soils shall be repaired as required by Section 2.1.1.D.9.
6. The Root Barrier Horizon C Soils shall not be intentionally penetrated when installing any Landscape Element. In the event of penetration, the Root

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- Barrier and Root Barrier Horizon C Soils shall be repaired as required by Section 2.1.1.D.9 before installation of the Landscape Element.
7. The Root Barrier and Warning Layer may be penetrated if necessary to conduct inspections or repairs to the Cap. Upon completion of the inspection or repair, the breach or penetration of the Warning Layer/Liner shall be repaired to meet the requirements of the 100% Design and the breach or penetration of the Root Barrier Horizon C Soils, Root Barrier, and Geocomposite Drainage Layer Cover Soils shall be repaired as required by Section 2.1.1.D.9.
 8. In the event of an unplanned breach or penetration of the Root Barrier, Warning Layer or Liner, notice shall be given of such breach to Honeywell and Jersey City within 24 hours. The breach or penetration of the Warning Layer/Liner shall be repaired to meet the requirements of the 100% Design and the breach or penetration of the Root Barrier Horizon C Soils, Root Barrier, and Geocomposite Drainage Layer Cover Soils shall be repaired as required by Section 2.1.1.D.9.
 9. All repairs to the Root Barrier Horizon C Soils, the Root Barrier and the Geocomposite Drainage Layer Cover Soils shall comply with the Master Intrusive Excavation Plan requirements developed pursuant to Section 2.1.1.F.2.
 10. A licensed New Jersey Professional Engineer shall certify to Honeywell and Jersey City all repairs to the Warning Layer and/or Cap.

E. Criteria for Intrusive Excavation. To the extent that Intrusive Excavation is required, the following criteria apply:

1. The criteria set forth in Section 2.1.1.D.
2. The criteria set forth in the Master Intrusive Excavation Plan to the extent applicable to the particular excavation.
3. Before any Intrusive Excavation, except in cases of emergencies, an entity that intends to excavate in the Open Space Areas shall prepare a Specific Intrusive Excavation Plan to supplement the Master Intrusive Excavation Plan. The Specific Intrusive Excavation Plan shall be approved by a licensed New Jersey Professional Engineer and submitted to Honeywell and

Jersey City. The Specific Intrusive Excavation Plan shall contain a Hazard Analysis check list of items considered critical to the Chromium Remedy including, but not limited to:

- a. Type of utility to be repaired or other work to be completed.
 - b. Contact New Jersey One Call.
 - c. Review of Record Drawings and the OSDS.
 - d. Depth to the invert of the utility.
 - e. Depth to the Warning Layer/Liner at the proposed repair location.
 - f. Guidance to workers regarding the requirement for soft digging methods such as hand excavation or use of equipment such as air knives within 12 inches of the Warning Layer/Liner.
4. A licensed New Jersey Professional Engineer shall be onsite to observe any Intrusive Excavation within one foot of the Warning Layer/Liner.
 5. Notice of each Intrusive Excavation, and a copy of the Specific Intrusive Excavation Plan, shall be provided to Honeywell and/or Jersey City for approval at least 5 business days in advance of any planned excavation and as soon as practicable with respect to any emergency excavation.
 6. The Hazard Analysis shall be reviewed with all workers associated with the task prior to excavation.

F. Master Intrusive Excavation Plan. Before any Intrusive Excavation takes place in the Open Space Areas or prior to the submission of the first Development Plan, whichever occurs first, Honeywell shall prepare a Master Intrusive Excavation Plan. The Master Intrusive Excavation Plan shall meet the requirements of this paragraph.

1. The Master Intrusive Excavation Plan shall include the following general requirements:
 - a. General methods for conducting Intrusive Excavation;
 - b. Types of precautions that may need to be taken to protect the Warning Layer/Liner;

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- c. The requirements for the repair of the Root Barrier Horizon C Soils, Root Barrier, Geocomposite Drainage Layer Cover Soils and Warning Layer/Liner;
 - d. Procedures to be implemented in the event of an unplanned breach or damage to the Root Barrier Horizon C Soils, Root Barrier, Warning Layer/Liner;
 - e. Procedures to be implemented in the event of an emergency excavation.
2. The Master Intrusive Excavation Plan shall require the following for all repairs and restoration of the Root Barrier Horizon C Soils, Root Barrier, and Geocomposite Drainage Layer Cover Soils:
- a. The Root Barrier shall be repaired in a manner designed to restore its barrier qualities using accepted engineering practices;
 - b. The Root Barrier Horizon C Soils and the Geocomposite Drainage Layer Cover Soils shall be re-established to the depth required by the 100% Design and compacted as follows depending on the size of the excavated area:
 - i. When the size of the excavated area is 1000 square feet or less, the Root Barrier Horizon C Soils and the Geocomposite Drainage Layer Cover Soils shall be repaired using accepted engineering practices to attempt to achieve a compaction equivalent to 90% maximum dry density as determined in accordance with ASTM D 698 (Standard Proctor); and
 - ii. When the size of the excavated area is greater than 1000 square feet, the Root Barrier Horizon C Soils and the Geocomposite Drainage Layer Cover Soils shall be repaired to 90% maximum dry density as determined in accordance with ASTM D 698 (Standard Proctor). A field density test shall be conducted at least once per 2,500 square feet or any part thereof and such repair shall be certified by a licensed New Jersey Professional Engineer;
3. The Master Intrusive Excavation Plan shall include an appendix for each utility in the Open Space Areas. Honeywell shall have each utility prepare an appendix to the Master Intrusive Excavation Plan which shall set forth

- the general methods for conducting excavation in the vicinity of the particular utility and the types of precautions that may need to be taken to protect the utility. The appendix shall be approved by a licensed New Jersey Professional Engineer. In conjunction with the preparation of the As-Built Documentation required by Section 3.1, the appendix shall be updated to include utility locations.
4. The Master Intrusive Excavation Plan and its appendices shall be reviewed at least every 5 years and updated as needed.
 5. The Master Intrusive Excavation Plan, including all of the appendices required by Section 2.1.1.F.3 above, shall be provided to those utilities and other entities that may need to excavate in the Open Space Areas and shall be made available from the City Engineer and the Honeywell Groundwater Treatment Plant. Anytime the Master Intrusive Excavation Plan and/or its appendices are updated, the updated version shall be provided to those utilities and other entities that may need to excavate in the Open Space Areas and shall be made available from the City Engineer and the Honeywell Groundwater Treatment Plant.

2.1.2 Restrictions on the Use and Placement of Fill

A. Fill Composition. Imported Fill shall be clean natural soil that is free of contamination, meets New Jersey Department of Environmental Protection (NJDEP) Technical Requirements pursuant to 7:26E 5.2(d), and has a hexavalent chromium concentration of 1 milligram per kilogram or less. Treated soils or other recycled materials imported from off-site sources are prohibited.

B. Fill Placement. All Fill shall be placed in conformance with Technical Specifications 2315 and 2374 of the 100% Design.

C. Stockpiling. Small stockpiles of less than 10 feet in height and less than 2 weeks in duration shall be allowed without prior approval or certification. Any stockpiling in excess of 10 feet in height or longer than 2 weeks in duration shall be subject to the approval of Honeywell and Jersey City based upon the certification of a licensed New Jersey Professional Engineer that the size and duration of any proposed stockpiling will not jeopardize the integrity of the Chromium Remedy or potentially affected infrastructure including but not limited to the Jersey City Municipal Utilities Authority 72 inch force main. The certification and approval

must be included with a Development Plan during the Initial Development Period. Subsequent to the Initial Development Period, the certification and approval is required but need not be submitted with a Development Plan.

D. Specific Requirements for Fill Soils in Landscape Areas. Fill soils in the Landscape Areas shall be placed in separate lifts as set forth below:

1. Soil Horizon A – Topsoil shall have a minimum depth of 6 inches. Topsoil shall be placed over the Horizon B and/or C soils to Final Development Grade. Topsoil shall be natural, friable, fertile loam, fine sandy loam or sandy loam with an organic matter content of 3.5% - 6% by weight and a pH range of 5.0 – 6.5.
2. Soil Horizon B – Horizon B soils shall only be used in areas where the total depth of Horizon A and C soils exceeds 24 inches above the Root Barrier. Horizon B soils of specified depths are required for the planting of all Landscape Elements as set forth in Section 2.2.9. Horizon B soils shall be a uniform sandy loam having the following properties: Sandy loam classification having 80% sand, \leq 10% silt, 10% clay (by weight), a pH range of 5.5 – 7.0, and organic matter (by weight) of 1.5-3.5%.
3. Soil Horizon C – A maximum of 18 inches of Horizon C soils shall be placed immediately above the Root Barrier. The first 6 inches of Horizon C soils above the Root Barrier shall be compacted to a minimum 90% maximum dry density as determined in accordance with ASTM D 698 (Standard Proctor) Horizon C soil shall consist of uniform sandy loam having the following properties: Sandy loam classification with 70-80% sand, \leq 10% silt, 15-20% clay (by weight), a pH range of 5.0 – 7.5, and organic matter (by weight) of 1% max.
4. Horizon A, B, & C soils shall be handled dry of optimum moisture to reduce the risk of over compaction. Compaction testing will be conducted on these soils prior to placement to determine placement criteria specific to the soil source.
5. Horizon A, B, & C soils shall be placed with low ground pressure equipment as set forth in Technical Specifications 2315 and 2374 of the 100% Design.
6. Soil Horizons B and C shall be blended by scarification (tilling) to a depth of 3 inches prior to the placement of the next layer, if the compaction of the prior

horizon has created a layer at the surface of the horizon that would not be conducive to healthy root growths.

E. Fill in Roadways. The portion of the road subgrade above the Geocomposite Drainage Layer Cover Soils shall meet the requirements in Section 2.2.1.A.2.B. These standards address the material and preparation requirements for the portion of the road subgrade above the Geocomposite Drainage Layer Cover Soils. The requirements for the materials and preparation of the portion of the road subgrade below the Cap, including the Geocomposite Drainage Layer Cover Soils, are in the 100% Design.

F. Fill Soils in Hardscape Areas. Fill in Hardscape Areas shall have a minimum depth of at least 24 inches from the surface to the Warning Layer/Liner, including the Geocomposite Drainage Layer Cover Soils.

2.1.3 Final Development Grading

A. Final Development Grade. The Open Space Areas Final Development Grading shall provide for the minimum soil depths shown in Figures 4 B-D and G-I, but no greater soil depths than two (2) feet above the soil depths shown in Figures 4 B-D and G-I unless a licensed New Jersey Professional Engineer has certified that the soil depths will not jeopardize the integrity of the Chromium Remedy or potentially affected infrastructure. After the Initial Development Period, such certification shall accompany any notice submitted under paragraph 60(j) (x) of the Study Area 6 North Consent Decree or paragraph 74(j) (x) of the Study Area 6 South Consent Decree to the extent that such notice relates to a proposed change in soil depths.

B. Regrading Plan. Any regrading of soils shall be conducted pursuant to a soil regrading plan that:

1. Is designed to maximize the reuse of soils from the prior grade and provides for the segregation and re-establishment of required soil horizons; and
2. Sets out the sequence of work for reaching the Final Development Grade.

C. Positive Surface Drainage. In all cases, the Open Space Areas must be graded to maintain positive surface drainage.

2.1.4 Bearing Pressure, Vehicle Load Limits and Bearing Areas

A. Incremental Bearing Pressure Limits. Except with regard to water features, each Permissible Development Element shall be designed to limit the incremental bearing pressure from its foundation load on the Liner to 1000 pounds per square foot as compared to the surrounding area, unless a greater incremental bearing pressure has been expressly certified as protective of the Cap by a licensed New Jersey Professional Engineer and subsequently approved by the Special Master or the Federal Court. No greater incremental bearing pressure shall be certified or approved unless it is demonstrated that the load imposed by the Permissible Development Element will not jeopardize the integrity of the Chromium Remedy. This limit on incremental bearing pressure on the Liner does not apply to loading due to vehicles. All vehicles, including Maintenance Equipment shall comply with the load limits set forth in Section 2.1.4.C for vehicles and Section 2.1.4.D for Maintenance Equipment.

B. Water Feature Load Limits. Water feature size and weight shall be structurally controlled so as to not cause loads greater than the equivalent soil mass imposed in the Final Development Grade. If higher loads are proposed, a licensed New Jersey Professional Engineer shall certify that the loads will not jeopardize the integrity of the Chromium Remedy, and such certification must be included in a Development Plan reviewed and approved by the Special Master or the Federal Court.

C. Vehicle Load Limits. There is no load limit on automobile and truck traffic on permanent Roadways, provided that permanent Roadways are constructed pursuant to Section 2.2.1.A and through trucks are prohibited pursuant to Jersey City ordinance as set forth in Section 2.2.1.A.8. Automobile and truck traffic is limited to Roadways except that trucks are permitted on temporary roads provided that they comply with the load limits specified in Subsection D.

D. Maintenance Equipment on Landscape Areas, Vehicles on Temporary Roadways. Maintenance Equipment is permitted on the Landscape Acreage and the Hardscape Areas in compliance with the following limits. Maintenance Equipment shall comply with the load limits specified in Table 1.

Table 1: Allowable Ground Pressure versus Fill Depth

| Maximum Ground Pressure | Fill Depth Over Warning Layer/Liner |
|---|--|
| Maximum Ground Pressure for Maintenance Equipment | |
| < 5 psi | 12 inches |
| 5-10 psi | 18 inches |
| >10-40 psi | 24 inches |
| | |
| Additional Maximum Ground Pressure for Temporary Roads | |
| Fully Loaded Highway Truck (>40-80 psi) | 36 inches |
| | |
| Permanent Roadways | |
| No maximum ground pressure limit | 36 inches |

The load limits on temporary roads and on Landscape and Hardscape Areas allow for heavier loads where a rigid pavement or temporary load spreading system such as mats is used to spread the load and reduce the bearing pressures to below the limits specified in Table 1, and where a licensed New Jersey Professional Engineer has certified to Honeywell and Jersey City that the rigid pavement or temporary load spreading system will reduce the bearing pressures to below the limits specified in Table 1.

E. Bearing Area – Foundations, Footers and Separation from Cap

1. Each point load from a Permissible Development Element shall have a minimum bearing area of 2 square feet except that traffic light poles and street light poles shall have a minimum bearing area of 3.5 square feet.
2. Each Permissible Development Element requiring a footer shall have a shallow footer.
3. Anchoring systems for Permissible Development Elements such as site furnishings shall be designed for surface mounting on spread footings. Hardscape areas shall accommodate surface mounted anchoring on spread footings.

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4. Restroom facilities shall be constructed on insulated matt foundations or spread footings or other equivalent foundations to reduce bearing pressures and counter frost penetration.
5. Use of driven posts for fencing or other purposes is prohibited unless it has been expressly certified by a licensed New Jersey Professional Engineer that the driven posts will not penetrate the Root Barrier Horizon C Soils and will not jeopardize the integrity of the Chromium Remedy and it has been subsequently approved by the Special Master or the Federal Court.
6. The use of stakes for activities such as erosion control fabrics or temporary snow fence will be subject to certification and approval of the City Engineer. Prior to granting approval the City Engineer must certify that the use of stakes will not jeopardize the integrity of the Chromium Remedy. In no case will the length of stake be greater than the depth from the ground surface to the Root Barrier less 6 inches in order to prevent penetration of the Root Barrier Horizon C Soils.
7. There shall be two feet of soil or more between the Warning Layer/Liner and the lowest elevation of the bedding for any footings and/or foundations.

2.2 SPECIFIC STANDARDS FOR PARTICULAR TYPES OF PERMISSIBLE DEVELOPMENT

2.2.1 Roads and Hardscape Areas

A. Permanent Vehicular Roadways. The following requirements apply to all Permanent Roadways:

1. For all Roadways, these standards address the material and preparation requirements for the portion of the road subgrade above the Geocomposite Drainage Layer Cover Soils. The requirements for the materials and preparation of the portion of the road subgrade below the Cap, including the Geocomposite Drainage Layer Cover Soils, are in the 100% Design.
2. The surface of all Roadways shall be a minimum of 3 feet above the Warning Layer/Liner. The three-foot minimum shall be comprised of the following layers:
 - a. The Geocomposite Drainage Layer Cover Soils installed pursuant to the 100% Design which has a nominal depth of 12 inches;

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- b. A layer of Structural Fill for Use Under Roadways which satisfies Technical Specification 2315 of the 100% Design. This layer shall have a minimum depth of 6 inches and shall be placed immediately above the Geocomposite Drainage Layer Cover Soils. This layer shall be compacted to 95% maximum dry density as determined in accordance with ASTM D 698 (Standard Proctor) ; and
 - c. A three-layer flexible pavement system which shall include an aggregate base course, a dense graded asphalt course and an asphalt wearing course. The three-layer flexible pavement system shall be placed immediately above the Structural Fill for Use Under Roadways in the order of the courses listed. The three-layer flexible pavement system shall have a total minimum depth of 18 inches. The materials used in the three-layer flexible pavement system shall satisfy the requirements of the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction. Each course of the three-layer flexible pavement system shall be prepared and installed to satisfy the requirements of the New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction and the City of Jersey City Design Standards for Roadways.
3. Alternative pavement designs may be acceptable provided that (a) the alternative design meets the requirements of Section 1.1.C, (b) obtains all requisite Jersey City approvals, and (c) a licensed New Jersey Professional Engineer certifies that the alternative design will not jeopardize the integrity of the Chromium Remedy and provides equal or better subgrade and utility protection as the three-layer flexible pavement system defined in this subparagraph. Such alternative design and certification shall be included in a Development Plan that is reviewed and approved by the Special Master or Federal Court during the Initial Development Period. After the Initial Development Period, such certification shall accompany any notice submitted under paragraph 60(j)(x) of the Study Area 6 North Consent Decree or paragraph 74(j)(x) of the Study Area 6 South Consent Decree. In the event that an approved alternate pavement system is less than 18 inches in depth, the depth of the Structural Fill for Use Under Roadways must be increased so that the minimum depth between the surface of the Roadway and the Warning Layer/Liner is 3 feet or more.

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4. Any improvement, new construction, expansion, and/or modification of the roadway to the east of the Open Space Areas, currently known as Route 440, that would result in any part of that roadway (as opposed to the Frontage Street currently shown on the Bayfront Redevelopment Plan at page 39) coming within the boundaries of one or more of the Open Space Areas shall:
 - a. Comply with the requirements of Paragraphs 60 of the Study Area 6 North Consent Decree and Paragraph 74 of the Study Area 6 South Consent Decree;
 - b. Meet or exceed the requirements of this Section 2.2.1.A;
 - c. Meet the requirements of Section 1.1.C, and obtain all requisite Jersey City approvals;
 - d. Have a design certified by a licensed New Jersey Professional Engineer who shall certify that the design will not jeopardize the integrity of the Chromium Remedy and provides equal or better subgrade and utility protection as the three-layer flexible pavement system defined in Section 2.2.1.A.2. Such design and certification shall be included in a Development Plan that is reviewed and approved by the Special Master or Federal Court during the Initial Development Period. After the Initial Development Period, such certification shall accompany any notice submitted under paragraph 60(j) (x) of the Study Area 6 North Consent Decree or paragraph 74(j) (x) of the Study Area 6 South Consent Decree.
5. All Roadways shall be designed to meet the City of Jersey City Design Standards (Figure 6). By way of illustration only, typical cross sections illustrating allowable pavement and landscape concepts for Third Avenue and Stegman Boulevard are shown in Figure 7.
6. Roadways shall be limited to the locations designated for Roadways in the 100% Design on Drawings CN-515 and C-516.
7. All curbing shall meet the City of Jersey City Design Standards. Curb types may vary as long as the total depth of curb and footing remains within the pavement box. The curb detail may extend beyond the pavement box provided it meets the required limits of separation from the Warning Layer/Liner. A licensed New Jersey Professional Engineer shall certify that the road and curb design will not jeopardize the integrity of the Chromium

- Remedy and such certification will be included in a Development Plan reviewed and approved by the Special Master or the Federal Court. No curb and pavement box design shall be certified or approved unless it is demonstrated that it will not jeopardize the integrity of the Chromium Remedy.
8. Through trucks are prohibited on Roadways. Roadways shall be posted to prohibit through trucks. Jersey City shall prohibit through trucks and require the posting of such prohibition in an ordinance prior to the installation of the Roadways. The standard becomes effective upon the effective date of a Jersey City ordinance prohibiting through trucks on Roadways.
 9. Every five years from the initial surfacing, a licensed New Jersey Professional Engineer shall inspect all Roadways in the Open Space Areas to evaluate whether the condition of any Roadway or segment thereof has compromised or is likely to compromise the structural integrity of the underlying subgrade or utilities. Within 30 days of the completion of the inspection, the licensed New Jersey Professional Engineer shall submit a certified report to Honeywell and Jersey City that describes the inspection undertaken and the repairs needed, if any, in order to address any condition that has compromised or is likely to compromise the structural integrity of the underlying subgrade or utilities. Within 18 months of the submission of the report, the repairs described in the report shall be completed. In the event that in the report the licensed New Jersey Professional Engineer deems a condition to constitute an emergency requiring immediate repair, such repair shall be made as soon as possible, and, if necessary, interim measures shall be employed to protect the cap, subgrade and utilities. Within 60 days of completion of the repairs, emergency or otherwise, a licensed New Jersey Professional Engineer shall inspect the repairs and certify that the repairs have been satisfactorily completed.

B. Temporary Construction Roads. The following requirements apply to all temporary construction roads:

1. In the event temporary construction roads are installed, these roads shall be limited to the locations designated for Roadways in the 100% Design on Drawings CN-515 and C-516. Temporary roads shall be installed using a load bearing geotextile fabric to isolate the wearing surface from the

- subgrade. A wearing surface shall be installed that is sufficient to handle the intended temporary traffic loadings. Temporary roads shall be designed consistent with the projected loads and frequency. Temporary roads shall be designed to be protective of the Chromium Remedy. A licensed New Jersey Professional Engineer shall certify that the temporary road design is protective of the Chromium Remedy and such certification shall be included in a Development Plan reviewed and approved by the Special Master or the Federal Court. No temporary road design shall be certified or approved unless it is demonstrated that it will not jeopardize the integrity of the Chromium Remedy.
2. The load limitations specified in Section 2.1.4.D of the OSDS and Section 02374 Part 3.3 G 7 of the Technical Specifications shall apply to all loads on the temporary roadways.

2.2.2 Hardscape Areas including Pedestrian Thoroughfare

Hardscape Areas shall have a minimum separation of 12 inches between the Warning Layer/Liner and the underside of the hard surfacing. The surface and subgrade materials shall be of sufficient strength to accommodate Maintenance Equipment.

2.2.3 Utilities

All utilities including those supporting the pump and treat system for groundwater remediation, with the exception of any extraction wells or collection trenches, shall be placed above the Cap as required in Paragraph 56(b) of the Study Area 6 North Consent Decree.

2.2.4 Utility Corridors

A. Public Utilities. All public utilities shall be located in a designated utility corridor and shall be installed in accordance with Paragraphs 60(j)(v)(6) and (7) of the Study Area 6 North Consent Decree. The location of the utility corridors is shown on Drawing CN-515 of the Study Area 6 North 100% Design and C-516 of the Study Area 6 South 100% Design. During the Initial Development Period, the modification of designated utility corridors or the designation of additional utility corridors, if necessary shall be subject to the review and approval of Honeywell, Jersey City, and the Special Master.

B. Placement within Utility Corridors. Placement of utilities within the utility corridor is flexible as long as the installation does not jeopardize the integrity of the Chromium Remedies and complies with the required separation from the Warning Layer/Liner set forth in the Consent Decrees.

C. Duct Banks. Duct banks shall be concrete encased.

2.2.5 Utility Corridors Beneath Roadways and Hardscape Areas

Except as provided in Section 2.2.6, the following utilities shall be located only within utility corridors beneath Roadways and Hardscape Areas in the Open Space Areas:

- Sanitary Sewers,
- Storm Drains,
- Water Mains,
- Electric Service,
- Telecommunications Service, and
- Gas Mains.

2.2.6 Utility Corridors-Irrigation and Local Electric and Water Service

A. Utilities Outside Corridors. The following utilities may be located outside of the utility corridors depicted on Drawings CN-515 and C-516, and may be placed in the interior park space of the Open Space Areas:

1. Water laterals for seasonal water service to amenities;
2. Irrigation mains and laterals; and
3. Local electric service supply for amenities.

B. Designation of Corridors. During the Initial Development Period, the design and location of additional utility corridors, if appropriate, shall be subject to the review and approval of Honeywell, Jersey City, and the Special Master. Upon completion of the design of these utilities the noted drawings shall be amended and recorded accordingly.

C. Minimum Fill Requirements. For any such utilities that may be installed outside a designated utility corridor, there shall be a minimum of two feet of fill between the Warning Layer/Liner and the lowest elevation of the bedding for any such utility.

D. Water Laterals. For seasonal water service to amenities, such as supply lines to drinking fountains. Portions of service lines may be located above the frost line and must be equipped with drain-back valves and hardware for winterization, in accordance with state and local plumbing codes.

E. Irrigation Mains and Laterals. Irrigation systems shall be designed by a licensed New Jersey Landscape Architect.

F. Electric Service. Electric service conductors for local power supply to park amenities such as light fixtures, controllers, (water feature) pumps, timers and other electrical devices shall be contained in buried conduits in accordance with all governing electrical codes. The grounding system for lighting and electrical services shall be installed at least one (1) foot above the Warning Layer/Liner in areas where the Fill Material is two feet. In other instances, the grounding system shall be installed at least two feet above the Warning Layer/Liner. The use of vertical grounding rods that require penetration through the Liner are prohibited.

2.2.7 Restrooms

If installed, restroom structures shall be located in close proximity to recreational use areas. Utilities associated with the restrooms shall meet the requirements of Sections 2.2.3 through 2.2.6. Restroom foundations shall meet the requirements of Section 2.1.4.E.

2.2.8 Water Features and Above Ground Water Cisterns

A waterproof liner system with leak detection shall be installed at all water features and cisterns.

2.2.9 Landscaping

A. Landscaping Acreage Requirement. The Consent Decrees require that 75% of each of the Open Space Areas, exclusive of the acreage used for roads and the pedestrian thoroughfare, be comprised of landscaping. Landscaping includes some

or all of the following: natural grasses, trees, shrubbery, flowers, and potted plants, provided that such landscaping and the anticipated root structure of each landscaping component shall not jeopardize the Chromium Remedies. Any portion of an athletic court or playground that is covered in natural grass shall be considered landscaping.

B. Supervision of Design and Installation. Landscaped Acreage shall be designed and installed under the supervision and direction of a licensed New Jersey Landscape Architect, licensed New Jersey Arborist, and a licensed New Jersey Professional Engineer with expertise in RCRA-style engineered caps. The selection of all plant material shall be performed under the direct supervision of a licensed New Jersey Landscape Architect and a licensed New Jersey Arborist.

C. Landscape Design Preparation. The licensed New Jersey Landscape Architect and licensed New Jersey Arborist shall use:

- Figures 4 C-E, H-J,
- Previously approved Development Plans,
- Utility corridor limits set forth in drawings CN-515 of the Study Area 6 North 100% Design and C-516 of the Study Area 6 South 100% Design, and
- The Bayfront Development Plan Section 6 Landscape Plan

when preparing the design for the Landscaped Acreage.

D. Landscaping Requirements. Landscaping shall meet the following requirements which are consistent with the protection of the integrity of the Chromium Remedy while supporting a viable and attractive landscape:

1. All landscaping shall be of the same type and characteristics of the landscaping classes set forth in Tables 2 through 4. Tables 2 through 4 include those plant species suitable for the Open Space Areas for specific depths of soils. Species included in Tables 2 through 4 are known to exhibit root systems with characteristically high root plate formation typical of species occurring in riparian plant communities as well as adaptability to urban environments.

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2. In the event that a landscape design includes a plant species not listed on Tables 2 through 4, such species shall be specifically identified as a new proposed species in a Development Plan subject to the review and approval of the Special Master or Federal Court. Such Development Plan shall not be approved unless it is demonstrated that the new proposed species has the same root growth characteristics as the same corresponding class of species in Tables 2 through 4, can thrive in the minimum soil depths set forth in the corresponding class applicable table, and is adaptable to urban environments.
3. While Landscape Elements may be located in or in close proximity to utility corridors, no Landscape Element (except natural grasses) shall be located in an area which would prevent access by Maintenance Equipment to any utility, including recovery wells. Landscape Elements within the Open Space Areas shall be located to facilitate access to recovery wells and monitoring wells for operation and maintenance. Trees shall not be located where the Canopy could extend over a pumping well or could inhibit access to pumps for maintenance.
4. Landscape Elements shall be planted in compliance with the soil depths requirements set forth in Tables 2 through 4 and Section 2.1.2.D or as follows for approved landscaping with comparable characteristics:
 - a. Table 2 class trees shall only be planted in areas where the Horizon B Soil is 18 inches or greater in depth;
 - b. Table 3 class trees shall only be planted in areas where the Horizon B Soil is 12 inches or greater in depth; and
 - c. Table 4 Column D class Large Shrubs & Ornamental Trees shall only be planted in areas where the Horizon B Soil is 12 inches or greater in depth.

E. Replacement of Landscaping. Landscaping has been grouped in Tables 2 through 4 into the following classes for the purpose of open space design: (i) turf grass, (ii) herbaceous perennials, (iii) small and medium shrubs, (iv) large shrubs and ornamental trees, (v) major deciduous trees, and (vi) major evergreen trees. Replacement of Landscape Elements with new landscaping of (a) the same class, (b) the same approximate density; and (c) in the same general vicinity within the Open Space shall be considered replacement-in-kind that is not subject to Court or Special Master approval. Replacement of Landscape Elements with (a) a

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different class of landscaping; (b) a substantially different density of landscaping; or (c) substantially different locations shall be considered a new landscape development which is subject to the Court or Special Master approval. However, in no case shall a different class of landscaping be approved unless it is demonstrated that the new class has the same root growth characteristics as the same corresponding class in Tables 2 through 4, can thrive in the minimum soil depths set forth in the corresponding class applicable table, and is adaptable to urban environments.

F. Landscaping Maintenance. All trees shall be installed and maintained as follows:

1. Direct drip irrigation systems may be provided.
2. No mounds of soil or other landscaping material shall be mounded around the trunk.

G. Thorns, Toxic Fruit Prohibited. Shrubs with dangerous thorns and toxic fruit are prohibited.

H. Lawn Areas. All lawn areas shall be established and maintained with an environmentally-friendly, drought tolerant, wear and pest resistant turf grass mixture, with low fertilizer needs, as recommended by the Rutgers' University turf grass breeding program. Seed mixture shall be suitable for New Jersey urban conditions.

I. Drainage. Landscaped Areas shall be designed to provide adequate drainage. Supplemental drainage systems including use of underdrains such as shown in the concept details Figures 5-7 or other functionally equivalent designs may be added by the Landscape Designer and incorporated into the drainage system for the Cap.

J. Raised planters. Raised planters are allowed provided they are consistent with the details in Figure 5. Other types of raised planters may be approved, but design specifications for such raised planters must be set forth in a Development Plan subject to review and approval by the Special Master or Federal Court. However, in no case shall other types of raised planters be approved unless it is demonstrated that they will not jeopardize the integrity of the Chromium Remedy.

K. Criteria for Selection of Landscape Elements. Landscape Elements shall be selected for installation in accordance with the following criteria:

1. **Referenced Standard** – All trees shall be commercially grown in accordance with ANLA publication, “American Standards for Nursery Stock” ANSI Z60.1 2004. (Attached as Exhibit 6).
2. **Source** – All trees and shrubs shall be nursery-grown stock raised in commercial nurseries specializing in the growth and supply of superior quality stock in accordance with ANSI Z60.1 2004 and certified to be free of any and all pathogens by inspection and certification at the time of harvesting. Nurseries shall be in a comparable bioregion to the Open Space Areas. “Plantation grown” trees referenced in ANSI Z60.1 2004 are not permitted.
3. **Lateral Root Growth** – The supply nursery shall have soil characteristics which support a shallow, horizontal high plate formation root systems. All trees and shrubs shall have been root pruned at initial planting (lining out) and transplanted a minimum of three times (trans.3x) in accordance with the ANSI Z60.1 2004 to eliminate downward (striker) roots. Additionally, supply nurseries shall demonstrate that progeny have been generated from mother stock of superior seed provenance with characteristic surface, horizontal, high plate formation root systems. Plant material selected for Open Space Areas shall be provided in numbers such that at time of harvesting (transplanting for shipment to the site), 5% of all individuals selected from the nursery stocks shall be excavated and the root systems exposed to demonstrate the absence of striker roots.
4. **Size** – Except as provided in Section 2.2.9.K.4.f, at the time of installation, Landscape Elements shall meet the size requirements set forth in Tables 2 through 4 or as follows below for approved landscaping with comparable characteristics:
 - a. Table 2 class deciduous trees shall have the following size:
 - i. a height no less than 10 feet and no greater than 16 feet;
 - ii. a caliper no less than 2 inches and no greater than 3.5 inches; and
 - iii. a root ball depth no greater than 34 inches.

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- b. Table 2 class evergreen trees shall have the following size:
 - i. a height no less than 7 feet and no greater than 8 feet;
 - ii. a spread between 4.5 and 5 feet if the height is 8 feet and between 3.5 and 4 feet if the height is 7 feet; and
 - iii. a root ball depth no greater than 34 inches.
- c. Table 3 class trees shall have the following size at the time of installation:
 - i. a height no less than 8 feet and no greater than 14 feet;
 - ii. a caliper no less than 1 inch and no greater than 2.5 inches; and
 - iii. a root ball depth no greater than 28 inches.
- d. Table 4, Column D class trees and shrubs shall have a root ball depth no greater than 28 inches.
- e. Table 4, Column C class shrubs shall have a root ball depth no greater than 16 inches.
- f. Landscape Elements with larger calipers, spreads and/or heights may be installed provided that the applicable root ball depth is not exceeded.
- g. For purposes of these requirements, the root ball depth, the caliper and the spread shall be measured according to ANZI Z60.1 2004.
- h. The size of each Landscape Element shall also allow for compliance with the planting requirements set forth in Section 2.2.9.L.

L. Planting Requirements. Verification and certification of the planting requirements set forth in this section shall be made as specified herein by the licensed professionals required under Section 2.2.9.B.

- 1. The depth of each planting hole shall in no case be deeper than 6 inches above the Root Barrier Horizon C Soils if machine excavation is employed or 2 inches above the Root Barrier Horizon C Soils if soft-digging methods are employed. The maximum allowed depth for each planting hole shall be set forth in a planting plan prepared as part of the landscape design for each

- Open Space Area and such maximum depths shall be certified on the plan by the licensed New Jersey Professional Engineer.
2. Balled and burlapped or containerized trees and shrubs shall be set during planting such that the top of the root ball (root flare) is approximately 2 inches above the final surface soil line. After balled and burlapped trees and shrubs have been set, burlap shall be removed from the top one third of the root ball and a visual inspection of the root structure shall be made by the licensed New Jersey Arborist or licensed New Jersey Landscape Architect to verify setting height. No backfilling of the planting hole shall be performed until the setting height has been verified by the licensed New Jersey Arborist or licensed New Jersey Landscape Architect. Staking of trees is prohibited.
 3. Large containerized shrubs shall be set with containers intact such that the top of the root ball is 2 inches above the final soil line. After verification of the setting height by the licensed New Jersey Arborist or licensed New Jersey Landscape Architect, the container shall be cut and removed leaving the bottom of the container in place. No backfilling of the planting hole shall be performed until the setting height has been verified by the licensed New Jersey Arborist or licensed New Jersey Landscape Architect. Large containerized shrubs are Table 4, column D class shrubs.

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Table 2: Bayfront Development – Major Trees

| Major Deciduous Trees | Mature Height | Canopy Width | Minimum Overall Fill Depth Above Root Barrier (feet) | Minimum Depth of Horizon B Soils (inches) | Application | Installed Size Range Caliper in Inches Height in Feet | Maximum Root Ball Depth (inches) | Native Species |
|--|---------------|--------------|--|---|----------------------|---|----------------------------------|----------------|
| ACER x freemanii 'Autumn Blaze' Autumn Blaze Red Maple | 50' | 40' | 3.5' | 18 | Street, Shade Tree | 2"-3½"cal. 10'-16' Ht. | 34 | Y |
| ACER rubrum 'varieties' Red Maple 'varieties' | 50' | 40' | 3.5' | 18 | Street, Shade Tree | 2"-3½"cal. 10'-16' Ht. | 34 | Y |
| ACER saccharum 'varieties' Sugar maple | 50' | 35' | 3.5' | 18 | Shade Tree | 2"-3½"cal. 10'-16' Ht. | 34 | Y |
| QUESCUS palustris Pin oak | 60' | 40' | 3.5' | 18 | Shade, Plaza Tree | 2"-3½"cal. 10'-16' Ht. | 34 | Y |
| FRAXINUS pennsylvanica 'varieties' Green Ash varieties & cultivars | 50' | 40' | 3.5' | 18 | Street, Shade Tree | 2"-3½"cal. 10'-16' Ht. | 34 | Y |
| ZELKOVA serrata 'varieties' Japanese Zelkova | 50' | 50' | 3.5' | 18 | Street, Shade, Plaza | 2"-3½"cal. 10'-16' Ht. | 34 | N |
| GINKGO biloba (male only) Ginkgo | 50' | 35' | 3.5' | 18 | Street, Shade, Plaza | 2"-3½"cal. 10'-16' Ht. | 34 | N |
| FRAXINUS americana White ash | 60' | 50' | 3.5' | 18 | Shade Tree | 2"-3½"cal. 10'-16' Ht. | 34 | Y |
| TILIA americana American Linden | 60' | 50' | 3.5' | 18 | Park, Plaza Tree | 2"-3½"cal. 10'-16' Ht. | 34 | Y |

STANDARDS

Honeywell

| Major Deciduous Trees | Mature Height | Canopy Width | Minimum Overall Fill Depth Above Root Barrier (feet) | Minimum Depth of Horizon B Soils (inches) | Application | Installed Size Range Caliper in Inches Height in Feet | Maximum Root Ball Depth (inches) | Native Species |
|---|---------------|--------------|--|---|-------------|---|----------------------------------|----------------|
| BETULA nigra River Birch | 40' | 30' | 3.5' | 18 | Park | 2"-3½"cal. 10'-16' Ht. | 34 | Y |
| ILEX opaca American holly | 40' | 20' | 3.5' | 18 | Park | 8' Ht. / 4½-5' Spd. | 34 | Y |
| THUJA occidentalis 'nigra' or 'techny' American or 'Techny' Arborvitae | 30' | 15' | 3.5' | 18 | Park | 7' Ht. / 3½-4' Spd. | 34 | Y |
| PICEA pungens Colorado Spruce | 50' | 30' | 3.5' | 18 | Park | 8' Ht. / 4½-5' Spd. | 34 | Y |
| CHAMECYPARIS thyoides Atlantic White Cedar | 35' | 15' | 3.5' | 18 | Park | 7' Ht. / 3½-4' Spd. | 34 | Y |
| CUPRESSOCYPARIS leylandii Leyland Cypress | 35' | 20' | 3.5' | 18 | Park | 7' Ht. / 3½-4' Spd. | 34 | N |

STANDARDS

Honeywell

Table 3: Minor Flowering / Ornamental Trees

| MM Minor Flowering / Ornamental Trees | Mature Height (feet) | Canopy Width (feet) | Minimum Overall Fill Depth Above Root Barrier (feet) | Minimum Depth of Horizon B Fill Soils (inches) | Application | Installed Size Range Caliper in Inches Height in Feet | Maximum Root Ball Depth (inches) | Native Species |
|---|----------------------------|---------------------------|--|--|-------------|--|---|-------------------|
| ACER compestre Hedge Maple | 30' | 25' | 3' | 12 | Park | 1"-2½"cal. 8'-14' Ht. | 28 | N |
| CERCIDIPHYLUM japonicum Katsura tree | 40' | 20' | 3' | 12 | Park | 1"-2½"cal. 8'-14' Ht. | 28 | N |
| CARPINUS betulus European hornbeam | 30' | 20' | 3' | 12 | Park | 1"-2½"cal. 8'-14' Ht. | 28 | N |
| MALUS spp. Crabapple | 20' | 20' | 3' | 12 | Park | 1"-2½"cal. 8'-14' Ht. | 28 | Y |
| CERCIS canadensis Eastern redbud | 25' | 25' | 3' | 12 | Park | 1"-2½"cal. 8'-14' Ht. | 28 | Y |
| CORNUS florida Flowering dogwood | 25' | 25' | 2.5' | 12 | Park | 1"-2½"cal. 8'-14' Ht. | 28 | Y |
| AMELANCHIER arborea Serviceberry | 25' | 20' | 2.5' | 12 | Park | 1"-2½"cal. 8'-14' Ht. | 28 | Y |
| CRATAEGUS viridis Hawthorn | 20' | 15' | 2.5' | 12 | Park | 1"-2½"cal. 8'-14' Ht. | 28 | Y |

STANDARDS



**Table 4: Ground Covers, Grasses, Shrubs and Small Trees Suitable
for Planting over the Liner at the Bayfront Development Site**

| A. | B. | C. | D. |
|---|--|---|---|
| <p>Turfgrass 1.0' Minimum Fill Depth above the Root Barrier</p> | <p>Herbaceous Perennials, and Ground Covers 1.5' Minimum Fill Depth above the Root Barrier</p> | <p>Small & Med. Shrubs and Native or Ornamental Grasses - 2'- 8' Ht. 2.0 Minimum Fill Depth above the Root Barrier Maximum Root Ball Depth – 16 inches</p> | <p>Minor Flowering /Large Shrubs & Ornamental Trees 3.0' Minimum Fill Depth above the Root Barrier Fill thickness by Soil Horizon Horizon A - 6 inches minimum Horizon B – 12 inches minimum Horizon C – 18 inches Maximum Root Ball Depth – 28 inches</p> |
| <p>Fine Fescue Lawn Mix</p> | <p>Aegopodium (Bishop Weed) Ajuga Arctostaphylos (Bearberry) Chrysogonum Convallaria (Lily of the Valley) Coreopsis (Tickseed) Echinacea (Coneflower) Ferns Heuchera (Coral Bells) Liriope (Lilly Turf) Pathenocissus (Virginia Creeper)</p> | <p>Aronia arbutifolia Berberris thunbergii (Dwarf) Clethra alnifolia (Summersweet) Cotoneaster horizontalis Euonymous (shrub form) Juniperus (spreaders to 4' ht.) Spiraea (dwarf varieties) Rhododendron (compact) Lonicera (low shrub form) Juniperus (chinensis low spreading) Spiraea (dwarf varieties) Cornus stolonifera Vaccinium angustifolia Miscanthus (Ornamental Grass) Pennisetum (Ornamental Grass) Andropogon (Bluestem)</p> | <p>Acer palmatum Amelanchier canadensis Cornus mas Ilex latifolia (Asiatic Holly) Juniperus chinensis Magnolia (virginiana & stellata) Picea (dwarf varieties) Pinus (dwarf varieties) Prunus - (low varieties) Styrax japonica Thuja (compact varieties) Chamaecyparis (dwarf varieties) Enkianthus campanulatus Forsythia suspense Hamamelis virginiana Ilex glabra</p> |

STANDARDS

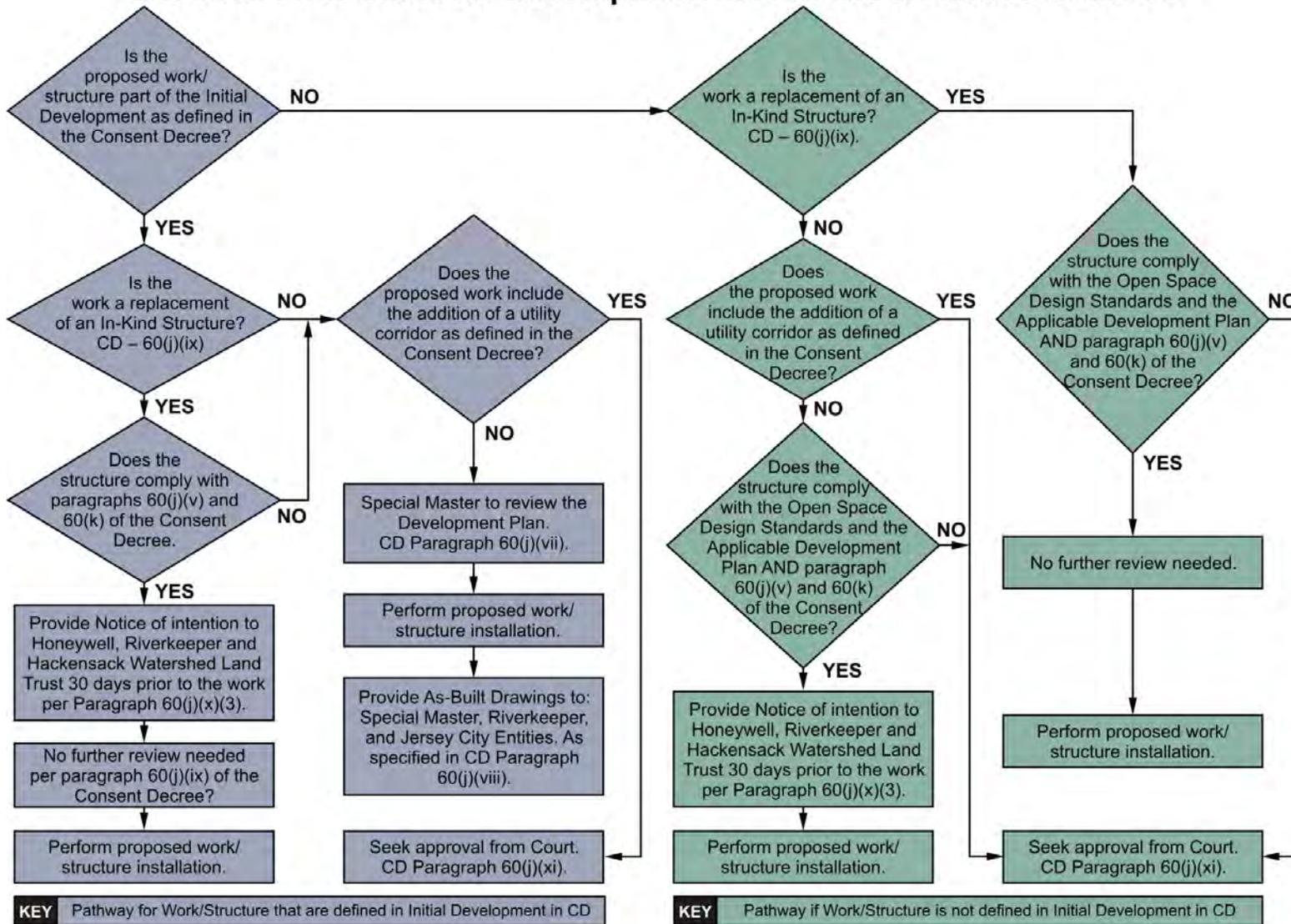
Honeywell

| A. | B. | C. | D. |
|----|---|--|---|
| | Phlox (Creeping Phlox) Rudbeckia (Black eyed Susan) Sedum spp. Verbena (creeping) Vinca minor Various Perennials (low) Fine Fescue (grasses) <ul style="list-style-type: none"> • Design mix for mowing • Design mix for no-mow All species from Table 6A | Sorghastrum (Indian Grass) Tripsacum (Dwarf Gamma Grass) Helictotrichon (Blue Oat Grass) Panicum virgatum (switchgrass) Rosa (low ornamental/shrub forms) All species from Table 6B | Ilex meservae Ilex verticillata Juniperus chinensis pfitzeriana Myrica pennsylvanica Rhododendron (hybrid varieties) Spiraea (shrub forms) Syringa (compact varieties) Taxus (cuspidata – low varieties) Viburnum spp. All species from Table 6 A & B |

3.0 ADMINISTRATION

The Consent Decrees define the approval process for Permissible Development in the Open Space Areas. In general, Permissible Development requires preparation of a Development Plan and approval of such plan by the Special Master or permits replacement-in-kind of previously approved Permissible Development. The following flow chart provides a general description of the process, but the Consent Decrees should be consulted for the specific requirements.

Decision Flow Chart for Development in AOC SA-6N and AOC SA-6S



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3.1 AS-BUILT DOCUMENTATION

As-Built drawing records shall be required for all Permissible Development to provide a reference for later work conducted pursuant to the OSDS. The requirement for as-built records during Initial Development is stipulated in Paragraph 60(j)(viii) of the Study Area 6 North Consent Decree. If any development or modifications are made following Initial Development, the Developer shall provide the same level of as-built documentation as required during the Initial Development period.

The as-built drawings Permissible Development shall include coordinates for each of the following as specified:

- Utilities: At the beginning and end points of a run and at any structure, turning points or changes of horizontal or vertical alignment.
- Utility Corridors: At all turn points such that the limits of the corridor can be easily identified.
- Final Development Grade
- Landscaped Areas: Types, locations, and limits
- Details on constructed Permissible Development Elements

4.0 LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|-----------------------------------|--|
| AOC | Area of Concern |
| NJDEP | New Jersey Department of Environmental Protection |
| OSDS | Open Space Design Standards |
| RCRA | Resource Conservation and Recovery Act |
| SA | Study Area |
| Study Area 6 North Consent Decree | Consent Decree Regarding Remediation and Redevelopment of Study Area 6 North |
| Study Area 6 South Consent Decree | Consent Decree Regarding Remediation and Redevelopment of Study Area 6 South |

FIGURES



Prepared/Date: RJR 06/09/13
Checked/Date: SGS 06/09/13

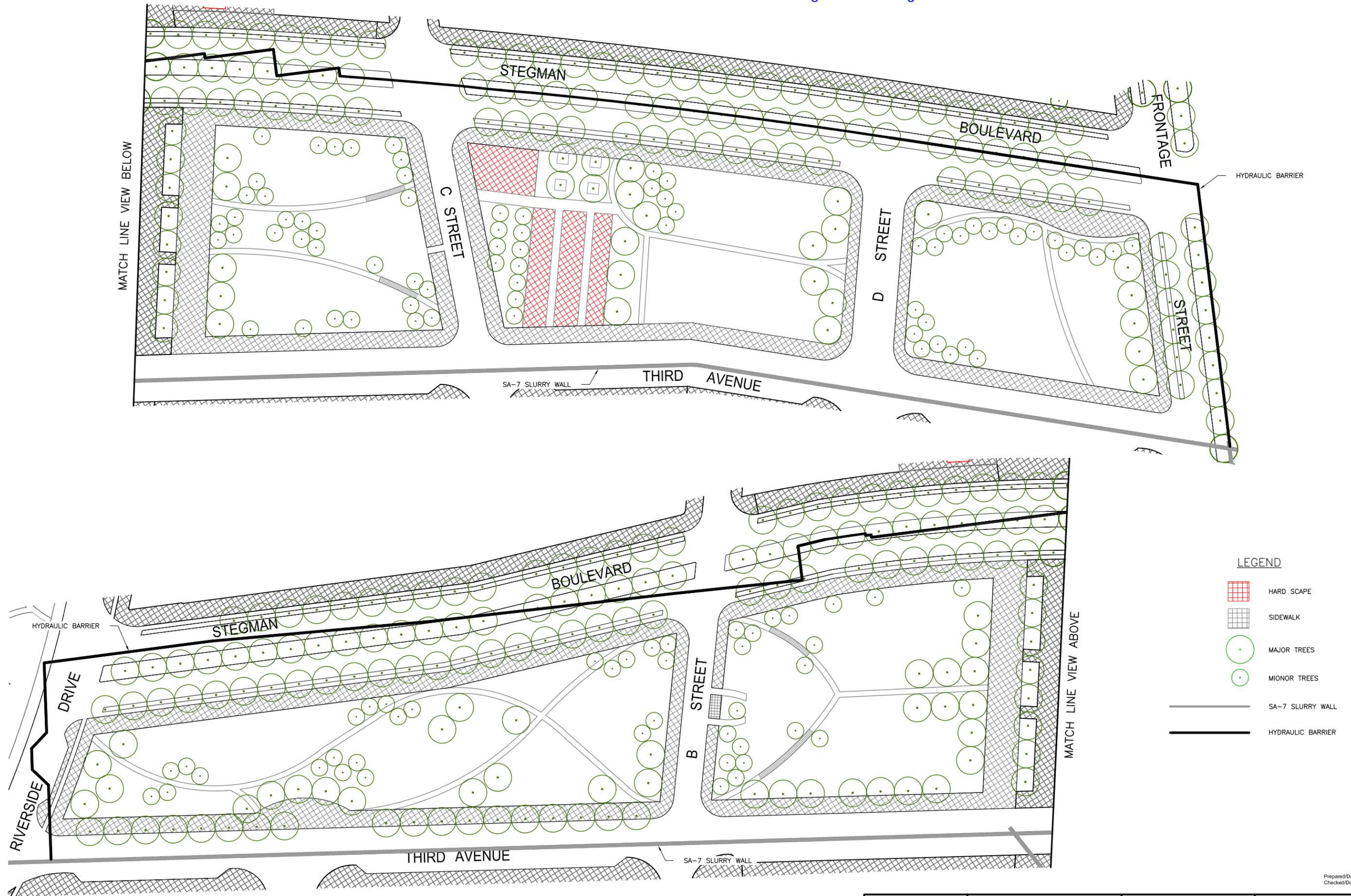


OPEN SPACE DESIGN STANDARDS
CHROMIUM REMEDY
STUDY AREAS 6 NORTH AND SOUTH
JERSEY CITY, NEW JERSEY



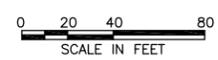
OPEN SPACE AREAS
FIGURE 1

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LEGEND

-  HARD SCAPE
-  SIDEWALK
-  MAJOR TREES
-  MINOR TREES
-  SA-7 SLURRY WALL
-  HYDRAULIC BARRIER



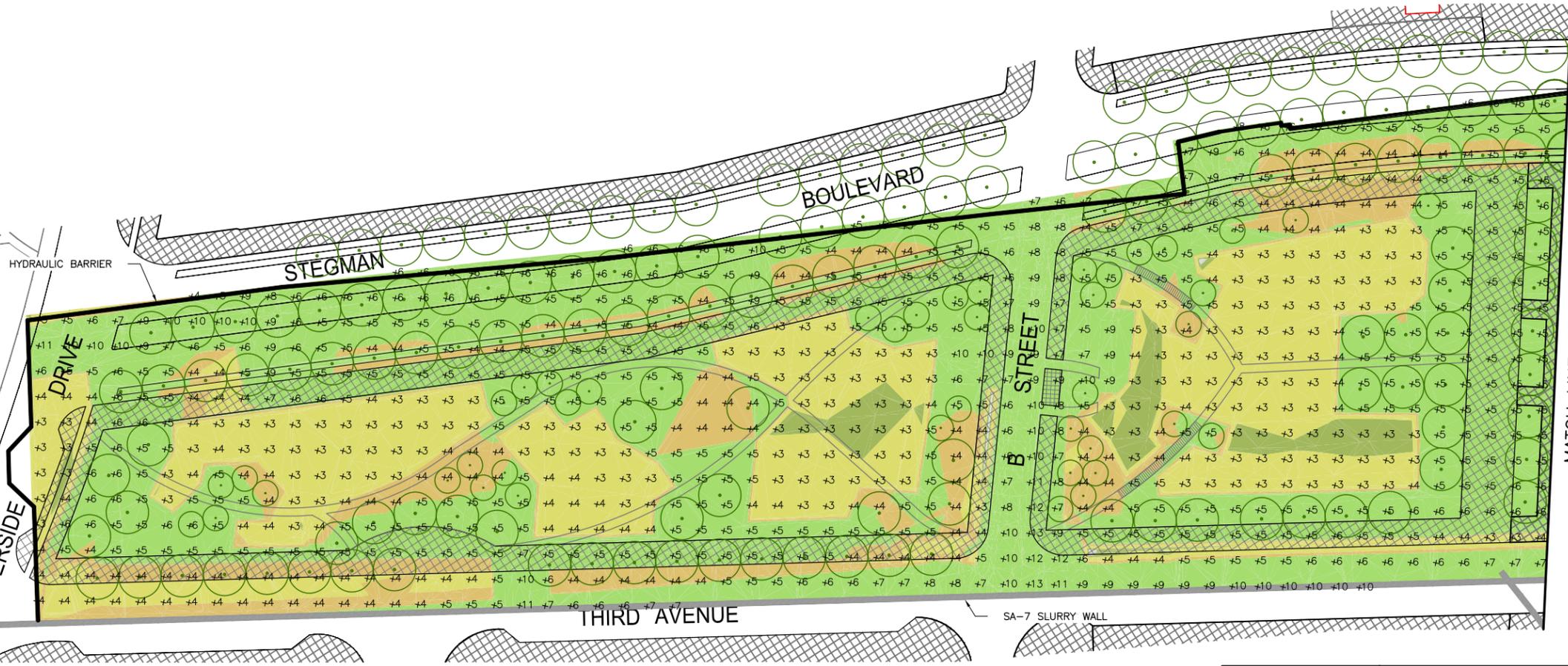
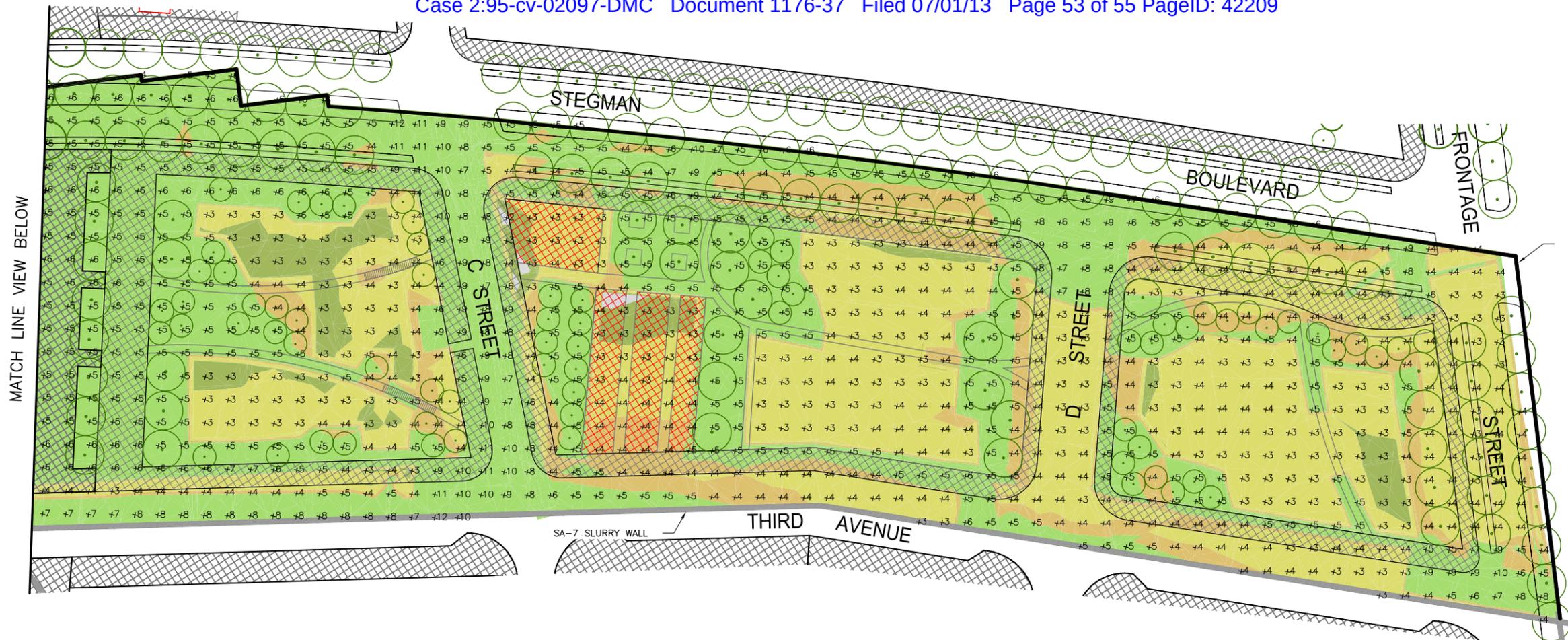
OPEN SPACE DESIGN STANDARDS
 CHROMIUM REMEDY, STUDY AREA 6 NORTH
 JERSEY CITY, NEW JERSEY
 HONEYWELL SITE ID - 37472



CENTRAL PARK
 LANDSCAPING AND HARDSCAPE CONCEPTS
 FIGURE 4A

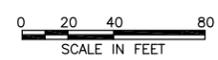
Prepared/Date: RJR 04/08/13
 Checked/Date: SGS 04/08/13

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- LEGEND**
- HARD SCAPE
 - SIDEWALK
 - MAJOR TREES
 - MINOR TREES
 - SA-7 SLURRY WALL
 - HYDRAULIC BARRIER

| Depth to Liner Table | | |
|----------------------|---------------|-------------|
| Minimum Depth | Maximum Depth | Color |
| 2.0 | 2.5 | Light Grey |
| 2.5 | 3.0 | Light Green |
| 3.0 | 4.0 | Yellow |
| 4.0 | 4.5 | Orange |
| 4.5 | 13.6 | Dark Green |



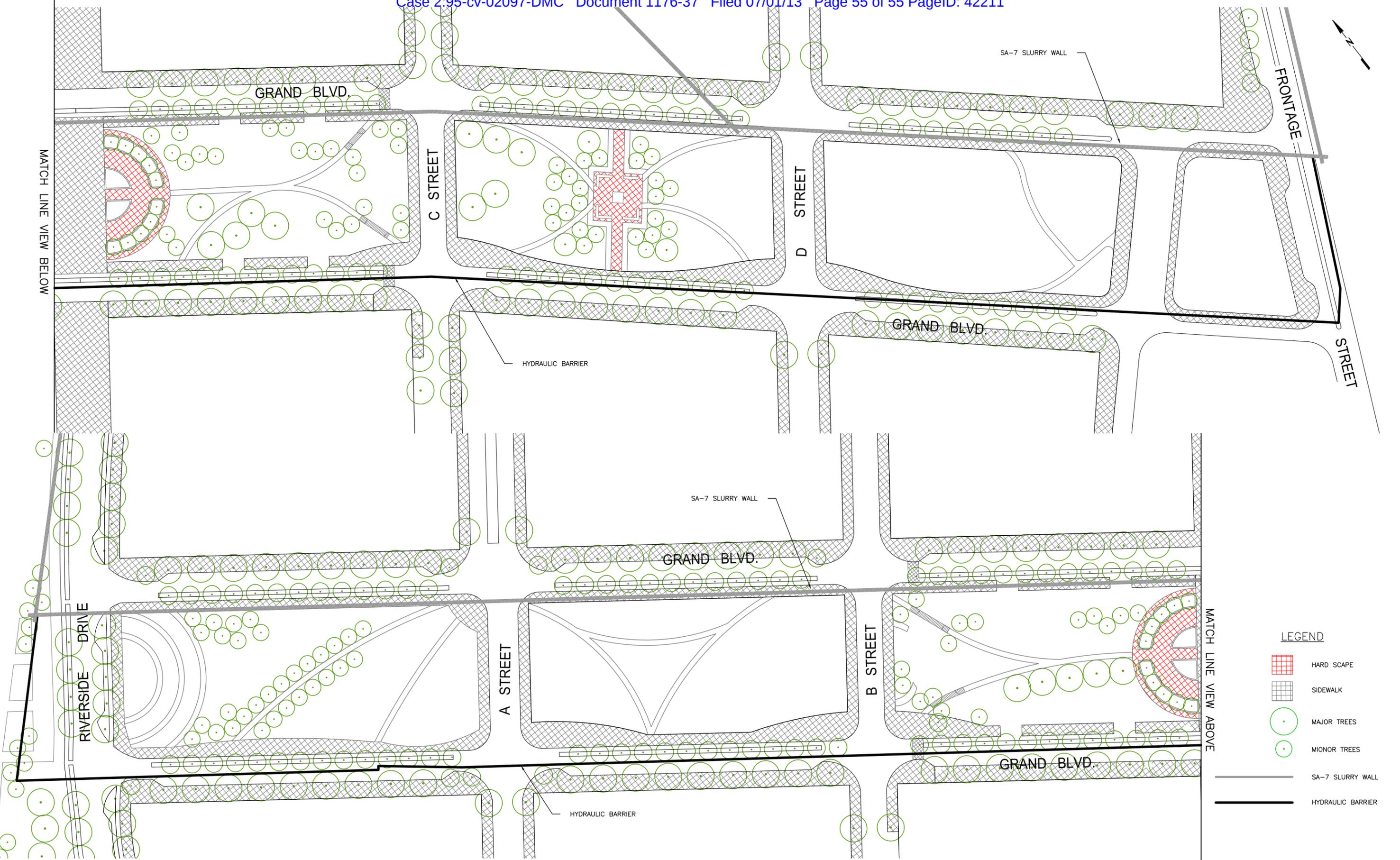
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OPEN SPACE DESIGN STANDARDS
CHROMIUM REMEDY, STUDY AREA 6 NORTH
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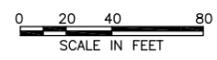
CENTRAL PARK
LANDSCAPING AND SOIL SPOT DEPTHS
TO WARNING LAYER/LINER
FIGURE 4D

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LEGEND

-  HARD SCAPE
-  SIDEWALK
-  MAJOR TREES
-  MINOR TREES
-  SA-7 SLURRY WALL
-  HYDRAULIC BARRIER



OPEN SPACE DESIGN STANDARDS
CHROMIUM REMEDIATION
STUDY AREA 6 SOUTH
JERSEY CITY, NEW JERSEY



PROMENADE
LANDSCAPING AND HARDSCAPE CONCEPTS
Figure 4F

Prepared/Date: RJR 06/09/13
Checked/Date: SGS 06/09/13

Z:\Projects\WONNEWELL\JERSEY CITY\Design-246-CSD\0405\0405\Figure 4F Landscaping Design.dwg Thu, 06 Jun 2013 11:22:01m wjg/rdj/aj