



November 11, 2015  
Revised November 25, 2015  
ES-3191.01

Earth Solutions NW LLC

- Geotechnical Engineering
- Construction Monitoring
- Environmental Sciences

Cosmos Development Company  
11747 Northeast 1<sup>st</sup> Street, Suite 300  
Bellevue, Washington 98005

Attention: Mr. Oscar Del Moro

**Subject: Small-Scale Infiltration Facilities  
Proposed Redmond City Center Development  
16135 Northeast 85<sup>th</sup> Street  
Redmond, Washington**

Reference: Earth Solutions NW, LLC  
Geotechnical Engineering Study and  
Critical Aquifer Recharge Areas Report, revised September 29, 2015

Dear Mr. Del Moro:

As requested, Earth Solutions NW, LLC (ESNW) has prepared this letter for the subject project. We understand both an infiltration trench and a drywell are proposed for installation within two areas along the eastern property line. The proposed infiltration areas were indicated on an exhibit (in blue) and provided to our firm for review. The exhibit is attached to this letter for reference. This letter was revised at the request of DCI Engineers, Inc. (DCI) to reflect the proposed on-site infiltration scheme.

The referenced geotechnical engineering study (study) was previously prepared by our firm for the subject site. In completion of the study, we advanced four soil borings on June 17, 2015 generally within each of the four corners of the site. The study should be referenced for a detailed description of subsurface conditions; however, in general, the site is underlain by younger alluvium deposits that are primarily coarse grained. Approximately two to four feet of silty sand fill was encountered atop the relatively clean sands at depth. It is noted loose silt with sand was encountered at the terminus of the soil boring advanced near the northeastern site corner, and areas of silty fine sand were observed within the boring advanced near the northwestern site corner.

Subsequent to our subsurface exploration, we completed United States Department of Agriculture (USDA) textural analysis interpolation for the representative soils samples that were collected at the soil boring locations and sieved in our laboratory. The updated sieve analysis sheets are attached to this letter for reference. In accordance with the USDA textural analysis scheme, the native, relatively clean sands were classified primarily as gravelly coarse sand. Irrespective of gravel content, fines contents of the gravelly coarse sand deposits were on the order of 2 to 11 percent. Laboratory interpolation results indicate the predominant grain size of the native sand likely to be encountered at infiltration facility base elevations is "coarse". In this respect, the gravelly coarse sand deposits are feasible for full infiltration of stormwater runoff.

Preliminary recommendations regarding infiltration design were provided in the study and, in our opinion, remain valid with respect to the proposed installation of small-scale infiltration facilities along the eastern property line. The study recommends a preliminary design infiltration rate of 5 inches per hour be used for consideration of infiltration facilities near boring location B-2. This rate was founded on the assumption that infiltration facilities will be designed to extend approximately five feet into existing grades, so as to advance through any existing fills, thereby being founded in relatively free-draining sands and gravels. Additionally, a minimum separation distance of five feet from the seasonal high groundwater table elevation must be incorporated into the design of the infiltration facilities.

In our opinion, both the infiltration trench and the drywell proposed for installation within the areas indicated on the attached exhibit are feasible from a geotechnical standpoint. In summary, the following recommendations and/or considerations are offered and should be incorporated into project plans as necessary:

- A preliminary infiltration design rate of 5 inches per hour should be utilized.
- The infiltration facilities should extend through the existing fills and into the relatively clean sands at depth. Overexcavations into the native sands must be minimized so as to allow for adequate separation between the infiltration facility bases and the seasonal high groundwater table elevation.
- Notwithstanding the study recommendation of completing in-situ infiltration testing at the "earliest feasible opportunity", it is our opinion such in-situ testing can be completed at any time prior to installation of the infiltration facilities so as to confirm the preliminary design infiltration rate of 5 inches per hour. Excavations into the proposed infiltration areas, even at the time of construction, will expose the soil subgrades that will inherently infiltrate the stormwater runoff, thereby providing the best possible "confirmation data" for the preliminary design assumptions. It is understood modifications to the proposed infiltration facilities and/or the stormwater management plan may be provided as a result of the in-situ testing. Based on correspondence between the project team and the City of Redmond, it is our understanding the in-situ testing will be completed during the Coordinated Civil Review process.

We trust this letter meets your current needs. Should you have questions regarding the content herein, or if additional information is required, please call.

Sincerely,

**EARTH SOLUTIONS NW, LLC**



Keven D. Hoffmann, E.I.T.  
Project Engineer



Kyle R. Campbell, P.E.  
Principal

Attachments: Proposed Infiltration Areas Exhibit  
Laboratory Sieve Analyses

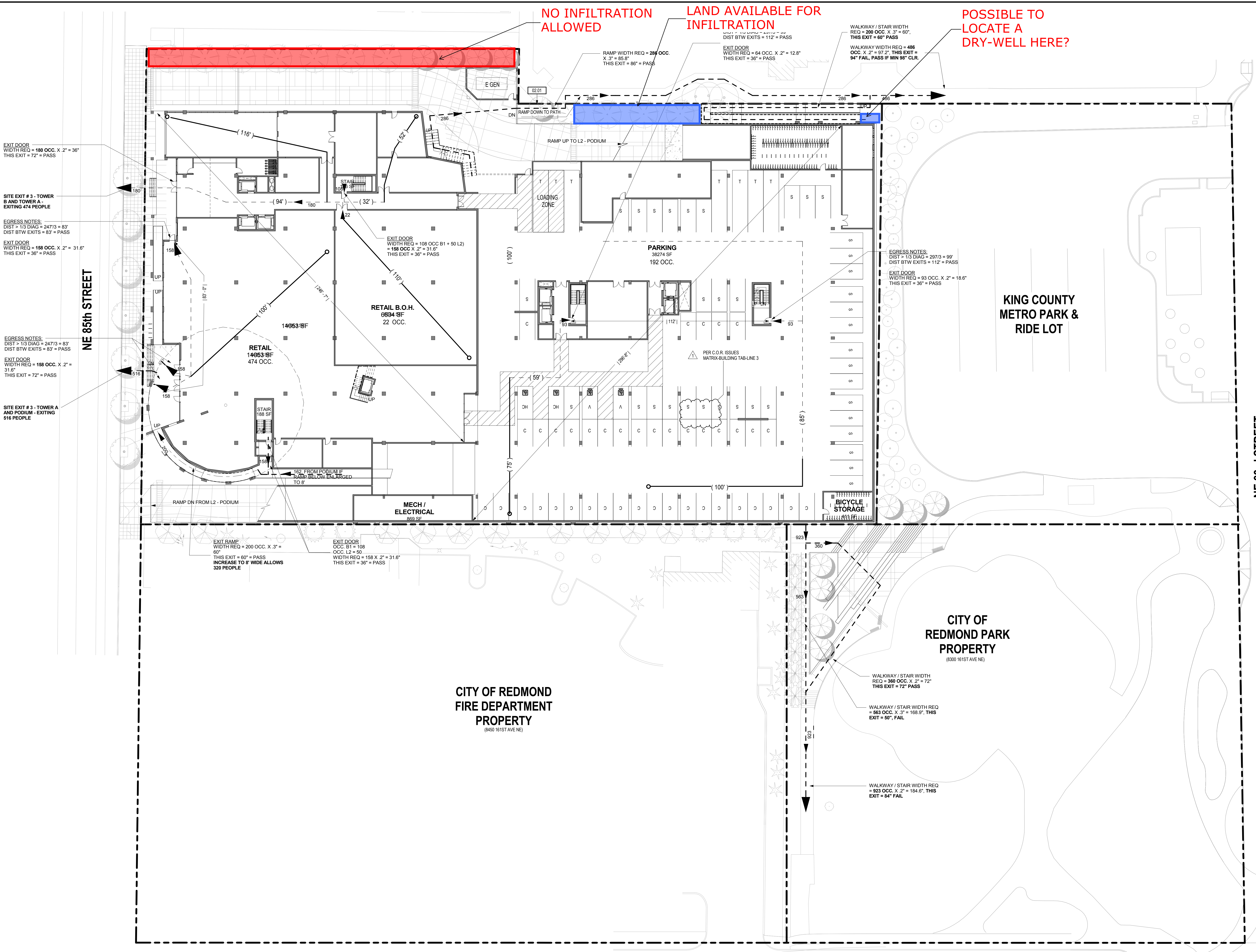
cc: DCI Engineers, Inc.  
Attention: Mr. Darren Simpson, P.E. (Email only)

Jackson | Main Architecture, PS  
Attention: Ms. Katerina Prochaska (Email only)

NO INFILTRATION ALLOWED

LAND AVAILABLE FOR INFILTRATION

POSSIBLE TO LOCATE A DRY-WELL HERE?



NE 85th STREET

NE 83rd STREET

161st AVE. NE

CITY OF REDMOND FIRE DEPARTMENT PROPERTY (845 161ST AVE NE)

CITY OF REDMOND PARK PROPERTY (8300 161ST AVE NE)

KING COUNTY METRO PARK & RIDE LOT

1 LEVEL L1 EXITING DIAGRAM 1" = 20'-0"

PROPOSED INFILTRATION AREAS EXHIBIT

REDMOND CITY CENTER 16135 NE 85TH ST. REDMOND, WA 98052 Cosmos Development Company

Table with 2 columns: DATE, DESCRIPTION. Row 1: 10/09/2015, 1 90% PREP RE-SUBMITTAL

FOR REFERENCE ONLY. NOT FOR CONSTRUCTION

PROJECT NO.: 12007 PROJECT MGR.: Designer DRAWN BY: Author CHECKED BY: Checker

L1 EXITING DIAGRAM G0.09 JACKSON | MAIN ARCHITECTURE P.S. © 2015



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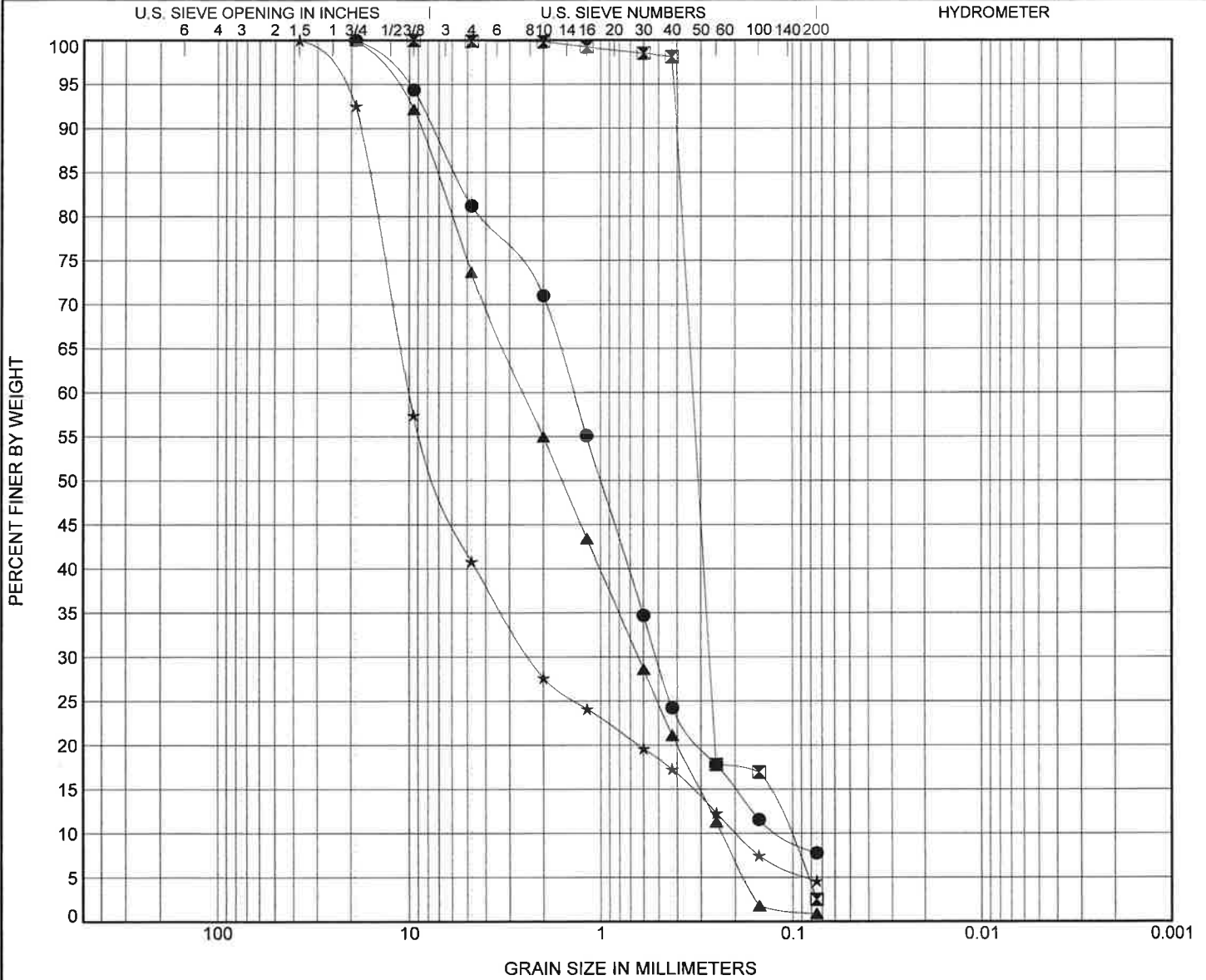
# GRAIN SIZE DISTRIBUTION

CLIENT Cosmos Development Company

PROJECT NAME Redmond City Center

PROJECT NUMBER ES-3191

PROJECT LOCATION Redmond



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

GRAIN SIZE USDA ES-3191.GPJ GINT US LAB.GDT 11/11/15

Specimen Identification	Classification					Cc	Cu		
● B-1 5.0ft.	USDA: Brown Gravelly Coarse Sand. USCS: SW-SM with Gravel.					1.69	12.31		
☒ B-1 35.0ft.	USDA: Brown Slightly Gravelly Sand. USCS: SP.					2.07	3.07		
▲ B-2 20.0ft.	USDA: Brown Very Gravelly Coarse Sand. USCS: SP with Gravel.					0.70	10.82		
★ B-3 20.0ft.	USDA: Brown Extremely Gravelly Loamy Coarse Sand. USCS: GW with Sand.					2.79	51.06		
Specimen Identification	D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
● B-1 5.0ft.	19	1.388	0.514	0.113				7.8	
☒ B-1 35.0ft.	9.5	0.33	0.271	0.107				2.5	
▲ B-2 20.0ft.	19	2.523	0.64	0.233				0.9	
★ B-3 20.0ft.	37.5	9.995	2.337	0.196				4.6	



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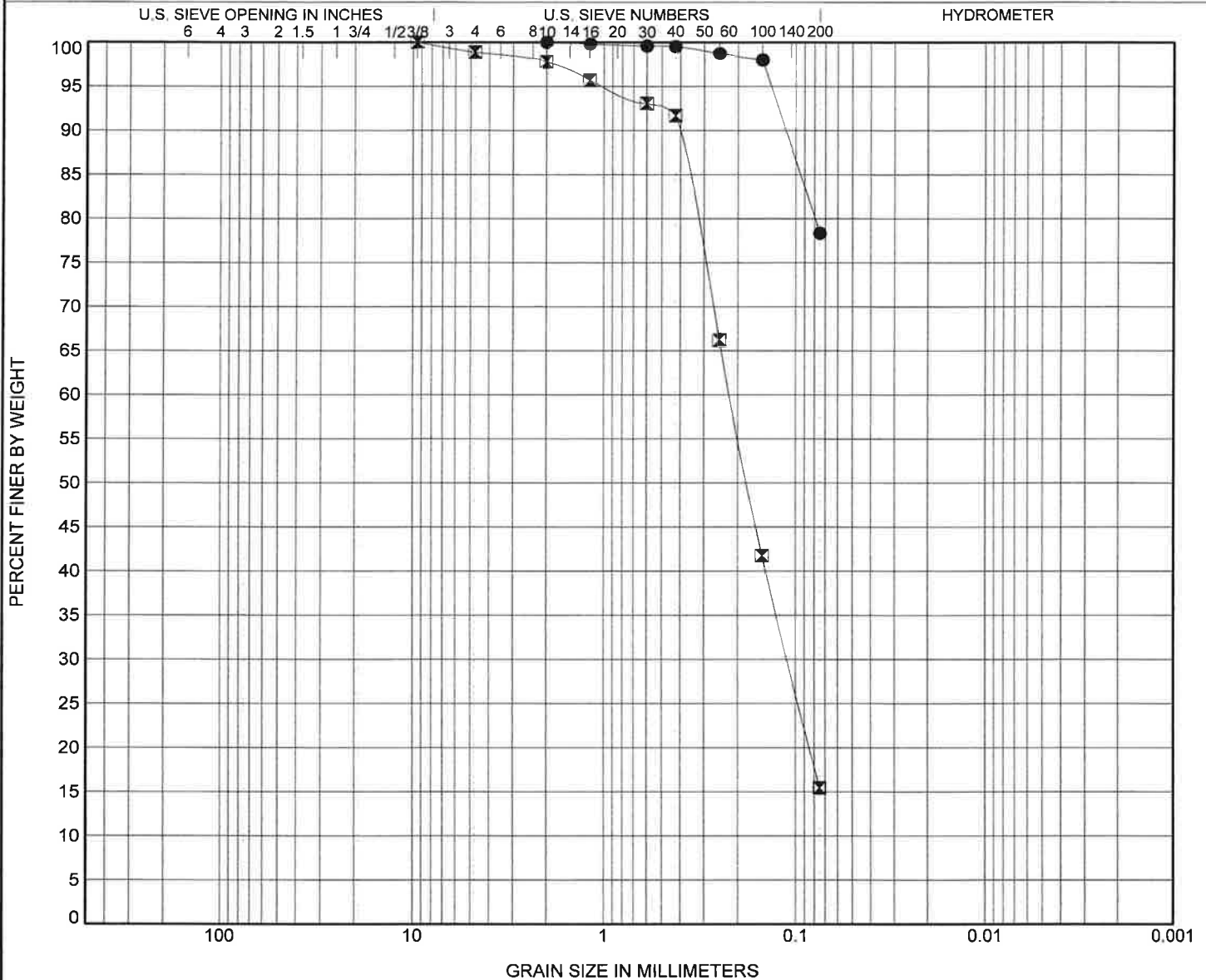
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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification							Cc	Cu
●	<b>B-3</b> 35.0ft.	<b>USDA: Brown Loam. USCS: ML with Sand.</b>								
☒	<b>B-4</b> 10.0ft.	<b>USDA: Brown Slightly Gravelly Loamy Sand. USCS: SM.</b>								
Specimen Identification		D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	<b>B-3</b> 35.0ft.	2							78.4	
☒	<b>B-4</b> 10.0ft.	9.5	0.22	0.11					15.5	

GRAIN SIZE USDA ES-3191.GPJ GINT US LAB.GDT 11/11/15