## CONSTRUCTION OBSERVATION AND TESTING REPORT FOR

GEOS NEIGHBORHOOD 69<sup>TH</sup> AND JOYCE STREET ARVADA, COLORADO

PREPARED FOR

COTTONWOOD PARK WEST, LLC 1240 LEHIGH STREET BOULDER, COLORADO 80305

AUGUST 2, 2017 PROJECT NUMBER 14725UF

303-759-8100 Fax 303-756-2920 www.agwassenaar.com

August 2, 2017

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, Colorado 80305

Subject:

Construction Observation and Testing Report for

Geos Neighborhood 69<sup>th</sup> and Joyce Street Arvada, Colorado

Project Number 144725UF

As requested, we have summarized our previously issued test reports in order to provide a more convenient record of this data:

Section 1 provides all soils testing conducted.

Section 2 provides all concrete testing conducted.

Section 3 provides all asphalt testing.

We trust this consolidated report provides a more readily accessible format of the testing provided. Supplemental data may be issued in the future.

If we can be of further assistance, please do not hesitate to call.

Sincerely,

A. G. WASSENAAR, INC.

Thomas A. Hastings, S.E.T

Vice President

TAH/klm

#### **SECTION 1**

## A.G. Wassenaar Consulting Engineers Geotechnical, Environmental and Balabard Recolera

**Fill Testing** 

Report #: FT-000001 Report Date: 8/17/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone (303) 759-8100

	8													
	1.1						Test R	lesuits						
Test#	Retest Of	Test Date	Proctor ID	Method	Soll Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	in Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Moisture Tolerance (%)	Remark
1		7/23/15	03	ASTM D698	A-4	14.0	116.0	14.2	114.2	8	98	95	-3/3	Pass
2		7/23/15	03	ASTM D698	A-4	14.0	116.0	14,1	115.7	8	100	95	-3/3	Pass
3		7/23/15	03	ASTM D698	A-4	14,0	116.0	14.9	114.4	8	99	95	-3/3	Pass
4		7/23/15	03	ASTM D698	A-4	14.0	116.0	16.1	101.8	8	88	95	-3/3	Fail
5		7/23/15	03	ASTM D698	A-4	14.0	116.0	14.7	114.9	8	99	95	-3/3	Pass
6		7/23/15	03	ASTM D698	A-4	14.0	116.0	14.0	115.2	8	99	95	-3/3	Pass
7		7/23/15	03	ASTM D698	A-4	14.0	116.0	14,7	114.0	8	98	95	-3/3	Pass
							Test Info	ormation						
Test#	Test Loc	ation						Elevation	Reference			iauge Model / SN	Field Tech	nician
1	Sanitary	Sewer Servi	ice. Alley B, Stat	ion 3+21.0	0			3.0	BSG		Troxler :	3430 036306	Bentley, Jin	n
2	Sanitary	Sewer Servi	ice: Alley B, Stat	ion 2+90.0	<u> </u>			3.0	BSG		Troxler :	3430 036306	Bentley, Jin	1
3	Sanitary	Sewer Servi	ice: Alley B, Stat	ion 2+74 0	0			3.0	BSG		Troxler	3430 036306	Bentley, Jin	n .
4			ice: Alley B, Stat					3.0	BSG		Troxler :	3430 036306	Bentley, Jin	1
5			nole: Alley B, 75					5.0	BSG		Troxler :	3430 036306	Bentley, Jin	1
6			nole: Afley B, 12:					2.0	BSG		Troxler :	3430 036306	Bentley, Jin	1
7	Sanitary	Sewer Mant	nole: Alley B, 17	5' west of S	SMH-156-56			2.0	BSG		Troxler :	3430 036306	Bentley, Jin	1
		R	emarks					Comments			-	Relate	ed Tests	
Pass: [	Density Pa	ss / Moistur	e Pass							l as "Backscatte	Test#	Related Test	t# Test	Туре
Fall: De	tests are "Direct Transing Gauge calibration data in Density Fail / Moisture Pass  7: The Contractor, E sanitary Sewer, main that tests taken this contracted samples were taken backfill utilizing an exercise."							rices in Alley be conclusive testing. The a compaction	B. The Contract rety passed or fa Contractor was n wheel to apply	or was informa iled due to the continuing to				

### A.G. Wassenaar

Consulting Engineers
Geotechnical, Environmenta

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone (303) 759-8100

#### **Fill Testing**

Report #: FT-000002 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

	1 10						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
8	4	7/24/15	03	ASTM D698	A-4	14.0	116.0	14.1	111.4	8	96	95	-3/3	Pass
9		7/24/15	01	ASTM D698	A-6	10.1	121.7	10,5	117,6	8	97	95	-1/3	Pass
10		7/24/15	01	ASTM D698	A-6	10,1	121.7	11.3	116,7	8	96	95	-1/3	Pass
11		7/24/15	01	ASTM D698	A-6	10.1	121.7	11.9	117.4	8	96	95	-1/3	Pass
12		7/24/15	01	ASTM D698	A-6	10,1	121.7	10.8	116.9	8	96	95	-2/2	Pass
13		7/24/15	01	ASTM D698	A-6	10.1	121.7	11.2	117.6	8	97	95	-2/2	Pass
				, I I I			Test Info	ormation		·				
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
8	Sanitary	Sewer Serv	ice Alley B, Stat	tion 2+58.0	0			3.0	BSG		Troxler	3430 33687	Plack, Ron	
9	Sanitary	Sewer Main	line, Alley B, 14	0' west of M	lanhole 156-56	·		6.0	BSG		Troxler	3430 33687	Plack, Ron	
10	Sanitary	Sewer Main	line: Alley B, 13	0' west of N	lanhole 156-56			5.0	BSG		Troxler	3430 33687	Plack, Ron	
11	Sanitary	Sewer Main	line: Alley B, 12	5' west of M	lanhole 156-56			4,0	BSG		Troxler	3430 33687	Plack, Ron	
12	Sanitary	Sewer Serv	ice: Alley B at S	tation 2+41	+00			3,0	BSG		Troxler	3430 33687	Plack, Ron	
_ 13	Sanitary	Sewer Serv	ice: Alley B at S	tation 2+11	+00			3.0	BSG		Troxler	3430 33687	Plack, Ron	
	Remarks							Comments	ya. Ta			Relate	d Tests	
Pass: [	Pass: Density Pass / Moisture Pass  Tests are *Direct Transmissi Gauge calibration data on file							testing agency	ž.		Test #	Related Test	# Test	Туре
	Ш				additi	he Contractor onal moisture ed compactive	was added an	e trench and d a sheepsfo	services using a ot wheel attache	a loader, No ed to a trackho	e			



Report #: FT-000003 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone (303) 759-8100

	1 11						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classificati	Optimum Molsture on (%)	Maximum Dry Density (pcf)	in Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
14		7/28/15	01	ASTM D698	A-6	10.1	121,7	11,1	107.4	8	88	95	-1/3	Fail
15	14	7/28/15	01	ASTM D698	A-6	10,1	121.7	11.5	115.7	8	95	95	-1/3	Pass
	1 1				1144		Test Info	rmation						
Test # Test Location								Elevation	Reference			Sauge Model / SN	Field Tech	nician
14	Sanitary	Sewer Serv	ice. Alley B at S	tation 1+95+	<b>-00</b>			4.0	BSG		Troxler	3430 33687	Plack, Ron	
15	Sanitary	Sewer Serv	ice: Alley B at S	tation 1+95	⊦00			4.0	BSG		Troxler	3430 33687	Plack, Ron	
Remarks								Comments				Relate	ed Tests	
Fall: Density Fail / Moisture Pass  Tests are "Direct Transmission" Gauge calibration data on file w										as "Backscatte	Test#	Related Tes	t# Test	Туре
Pass: (								l and a sheep					•	

# A.G. Wassenaar Consulting Engineers Geotechnical, Environmental and Related Services

**Fill Testing** 

Report #: FT-000004 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone: (303) 759-8100

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	Ton.						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Moisture Tolerance (%)	Remark
16		7/29/15	01	ASTM D698	A-6	10.1	121.7	10.4	110.3	8	91	95	-1/3	Fail
17		7/29/15	01	ASTM D698	A-6	10.1	121,7	11.2	115.9	8	95	95	-1/3	Pass
18		7/29/15	01	ASTM D698	A-6	10.1	121.7	10.9	117.3	8	96	95	-1/3	Pass
19		7/29/15	01	ASTM D698	A-6	10.1	121,7	11.3	116.8	8	96	95	-1/3	Pass
20		7/29/15	01	ASTM D698	A-6	10.1	121,7	10.0	117.0	8	96	95	-1/3	Pass
21	16	7/29/15	01	ASTM D698	A-6	10.1	121,7	10.3	117.8	8	97	95	-1/3	Pass
22		7/29/15	01	ASTM D698	A-6	10.1	121.7	11.1	118.2	8	97	95	-1/3	Pass
23		7/29/15	01	ASTM D698	A-6	10,1	121_7	10.8	119.2	8	98	95	-1/3	Pass
	1 3						Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
16	Sanitary	Sewer Serv	ice: Alley B at Si	ation 1+78	+00			5.0	BSG		Troxler	3430 33687	Plack, Ron	
17	Sanitary	Sewer Serv	ice: Alley B at SI	ation 1+63	+00		-	4.0	BSG		Troxler	3430 33687	Plack, Ron	
18	Sanitary	Sewer Main	line: Alley B, 30'	east of Ma	nhole 156-28			6.0	BSG		Troxler	3430 33687	Plack, Ron	
19			line: Alley B, 40'					4.0	BSG		Troxler	3430 33687	Plack, Ron	
20	Sanitary	Sewer Main	line: Alley B, 50'	east of Ma	nhole 156-28			2,0	BSG		Troxler	3430 33687	Plack, Ron	
21	Sanitary	Sewer Serv	ice: Alley B at Si	ation 1+78	+00			5.0	BSG		Troxler	3430 33687	Plack, Ron	
22	Sanitary	Sewer Serv	ice: Alley B at Si	ation 1+47	+00		·	6,0	BSG		Troxler	3430 33687	Plack, Ron	
23	Sanitary	Sewer Main	line: Alley B, 45'	east of Ma	nhole 156-28		-	3,0	BSG		Troxler	3430 33687	Plack, Ron	
	132	R	emarks		1 1		(	Comments				Relate	d Tests	
	ail: Density Fail / Moisture Pass  Tests are "Direct Transmission Gauge calibration data on file							od A) unless pr	obe depth is noted	l as "Backscatte	Test #	Related Test		Туре
Pass: [	Density Pa	ass / Moistui	re Pass						lo additional moi rackhoe applied				-	



Report #: FT-000005 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone (303) 759-8100

	1711						Test R	esults	7					
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	in Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
24		7/30/15	01	ASTM D698	A-6	10.1	121.7	10.1	115.6	8	95	95	-1/3	Pass
25		7/30/15	01	ASTM D698	A-6	10.1	121.7	10.7	116.1	8	95	95	-1/3	Pass
26		7/30/15	03	ASTM D698	A-4	14,0	116.0	15.3	112.3	8	97	95	-3/3	Pass
27		7/30/15	03	ASTM D698	A-4	14.0	116.0	14.2	113.4	8	98	95	-3/3	Pass
L							Test Info	rmation						
Test#	Test Loc	ation		-				Elevation	Reference			auge Model / SN	Field Tech	nician
24			ice: West 68th P					5.0	BSG		Troxler	3430 33687	Plack, Ron	
25			ice Alley B at st					2.0	BSG		Troxier	3430 33687	Plack, Ron	
26	Sanitary	Sewer Main	line: West 68th I	Place 50' w	est of Manhole 1	56-55		6.0	BSG		Troxier	3430 33687	Plack, Ron	
27	Sanitary	Sewer Main	line. West 68th	Place, 45' w	est of Manhole	56-55		5.0	BSG		Troxier	3430 33687	Plack, Ron	
	1 1	R	emarks					Comments				Relate	d Tests	
Pass: I	: Density Pass / Moisture Pass Tests are "Direct Transmission" Gauge calibration data on file will							od A) unless pi testing agency	obe depth is noted	l as "Backscatte	Test #	Related Test	# Test	Туре
	Gauge calibration data on i  27: The Contractor place loader. Moisture was ad sheeps foot wheel attact The Contractor has prevattachment is a very sul operator has continuous compaction of the backle when tests are conducted.						as added using attached to a tra s previously bea y subjective pla nuous control. T backfill as a wh	a fire hose a ackhoe mixe en informed t ece of compa Therefore, ou	attached to a wat d and applied co hat the sheepsforction equipment or tests may not r	ler truck, and a impactive effor pot wheel t and that the represent the				

### A.G. Wassenaar

Fleid Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222

Phone (303) 759-8100

#### **Fill Testing**

Report #: FT-000006 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

							Test R	esults						
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Molsture Tolerance (%)	Remari
28		7/31/15	01	ASTM D698	A-6	10.1	121.7	11.1	110.3	8	91	95	-1/3	Fail
29		7/31/15	01	ASTM D698	A-6	10.1	121.7	10,9	109.6	8	90	95	-1/3	Fail
30	28	7/31/15	01	ASTM D698	A-6	10.1	121,7	11.5	115.7	8	95	95	-1/3	Pass
31	29	7/31/15	01	ASTM D698	A-6	10.1	121.7	11.1	115 9	8	95	95	-1/3	Pass
32		7/31/15	03	ASTM D698	A-4	14,0	116.0	14.3	111.4	8	96	95	-3/3	Pass
33		7/31/15	03	ASTM D698	A-4	14.0	116.0	14.1	112.3	8	97	95	-3/3	Pass
34		7/31/15	03	ASTM D698	A-4	14.0	116.0	14.7	113.2	8	98	95	-3/3	Pass
35		7/31/15	03	ASTM D698	A-4	14,0	116.0	14,9	112,7	8	97	95	-3/3	Pass
							Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			auge Model / SN	Field Tech	nician
28	Sanitary	Sewer Serv	ice West 68th P	lace, Static	n 0+60+67			3,0	BSG		Troxler	3430 33687	Plack, Ron	
29			ice: West 68th P					3.0	BSG		Troxler	3430 33687	Plack, Ron	
30			ice. West 68th P					3.0	BSG		Troxler	3430 33687	Plack, Ron	
31			ice: West 68th P					3.0	BSG			3430 33687	Plack, Ron	
32			ice: Alley A, Stal					6.0	BSG			3430 33687	Plack, Ron	
33			ice: Alley A, Stat					5.0	BSG			3430 33687	Plack, Ron	
34			ice: Alley A, Stat					4.0	BSG			3430 33687	Plack, Ron	
35	Sanitary	Sewer Serv	ice: West 68th P	lace, Static	n 0+7.0			5.0	BSG		Troxler	3430 33687	Plack, Ron	
		R	emarks					Comments			1000	Relate	d Tests	
	Remarks  ensity Fail / Moisture Pass  Tests are "Direct Transmission Gauge calibration data on file  Density Pass / Moisture Pass									as "Backscatter	Test #	Related Test	# Test	Туре

## A.G. Wassenaar Consulting Engineers Geolechnical, Environmental

2180 South Ivanhoe Street, Suite 5

Field Services

Denver, CO 80222 Phone: (303) 759-8100 **Fill Testing** 

Report #: FT-000006 Report Date: 8/18/2015

Test Method: ASTM D 6938

Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soll Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
36		7/31/15	03	ASTM D698	A-4	14.0	116.0	14.2	111.4	8	96	95	-3/3	Pass
37		7/31/15	03	ASTM D698	A-4	14.0	116.0	14.5	112.0	8	97	95	-3/3	Pass
38		7/31/15	01	ASTM D698	A-6	10.1	121.7	1101	116.6	8	96	95	-1/3	Pass
							Test Info	rmation					21-17-2	3 17
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Techi	nician
36	Sanitary	Sewer Main	line: West 68th	Place, 30' w	vest of Manhole 1	56-55		3.0	BSG		Troxler	3430 33687	Plack, Ron	
37	Sanitary	Sewer Main	line: West 68th	Place, 35' w	vest of Manhole 1	56-55		2.0	BSG		Troxler	3430 33687	Plack, Ron	-
38	Sanitary	Sewer Main	line: West 68th	Place, 40' w	vest of Manhole 1	56-55		1.0	BSG		Troxler	3430 33687	Plack, Ron	-
		R	emarks			T.		Comments				Relati	ed Tests	
Pass: [	s: Density Pass / Moisture Pass  Tests are "Direct Transmissic Gauge calibration data on file							od A) unless pr lesting agency	obe depth is nated	l as "Backscat	ter". Test #	Related Tes	t# Test	Туре
					Moist	ure was adde	ed with a fire ho	se attached t	th and services used a water truck at and applied co	and a			,	·

### A.G. Wassenaar

Consulting Engineers Geolechnical, Environmental and Related Services

Field Services
2180 South Ivanhoe Street, Suite 5

Denver CO 80222 Phone (303) 759-8100

#### **Fill Testing**

Report #: FT-000007 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Moisture Tolerance (%)	Remark
39		8/3/15	03	ASTM D698	A-4	14.0	116.0	14.1	113.7	8	98	95	-3/3	Pass
40		8/3/15	03	ASTM D698	A-4	14.0	116,0	14.7	115.2	8	99	95	-3/3	Pass
41		8/3/15	03	ASTM D698	A-4	14.0	116.0	15.1	114.7	8	99	95	-3/3	Pass
42		8/3/15	03	ASTM D698	A-4	14.0	116.0	16.4	112.6	8	97	95	-3/3	Pass
43		8/3/15	02	ASTM D698	A-6	15,8	109.1	19.5	105.8	8	97	95	-1/3	Pass
44		8/3/15	02	ASTM D698	A 6	15.8	109.1	18.7	106.9	8	98	95	-1/3	Pass
45		8/3/15	02	ASTM D698	A-6	15.8	109.1	18.6	108.4	8	99	95	-1/3	Pass
46		8/3/15	02	ASTM D698	A-6	15,8	109_1	20.9	105.6	8	97	95	-1/3	Fail
							Test Info	ormation						
Test#	Test Loc	ation						Elevation	Reference		Make /	auge Model / SN	Field Tech	nician
39			line: Alley A, 10					2.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
40			hole: Alley A, So					6.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
41			hole: Alley A, No			:		5.0	BSG			k 3500 1910	Blom, Doug	
42			hole: Alley A, No					3.0	BSG			k 3500 1910	Blom, Doug	'
43			line; Alley A, 30					5.0	BSG			k 3500 1910	Blom, Doug	
44 45			line Alley A, 20					3.0	BSG			k 3500 1910	Blom, Doug	
46	Sanitary Sewer Manhole; Alley A, North of SSMH 156-28 Sanitary Sewer Manhole; Alley A, West of SSMH 156-28							2.0	BSG BSG			k 3500 1910 k 3500 1910	Blom, Doug	
-10	Carnary			COL OI OOM	1 130-20			Comments	1836		IIISIIOTE			
	Remarks  Density Pass / Moisture Pass  ensity Pass / Moisture Fail							od A) unless p	robe depth is noted	as "Backscatter	Test #	Related Test	# Test	Туре



Report #: FT-000007 Report Date: 8/18/2015 Test Method: ASTM D 6938

1240 Lehigh Street Boulder, CO 80305

Cottonwood Park West, LLC

Client:

Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

Field Services
2180 South Ivanhoe Street, Suite 5
Denver CO 80222

Denver CO 80222 Phone: (303) 759-8100

	110						Test R	esults						
Test #	Retest Of	Test Date	Proctor ID	Method	Soli Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
47	46	8/3/15	02	ASTM D698	A-6	15,8	109.1	19.0	107,1	8	98	95	-1/3	Pass
	I II						Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			iauge Model / SN	Field Tech	nician
47	Sanitary	Sewer Man	hole. Alley A, W	est of SSMI	1 156-28			2.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
		R	temarks					Comments			I E VE	Relate	ed Tests	
Pass: [	Pass: Density Pass / Moisture Pass  Tests are "Direct Transmission" Gauge calibration data on file with									as "Backscatter"	Test #	Related Tes	t# Test	Туре
					attach	ment (Deere	r. E-Z Excavatir 892E LC) to appre was applied	pply compact	excavator with ive effort to the i	a wheel utility trench				

# A.G. Wassenaar

Field Services

Denver, CO 80222

2180 South Ivanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000008 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Phone: (303) 759-8100 **Test Results** Optimum Maximum In Place In Place Probe Optimum Retest Test Soil Moisture **Dry Density** Moisture **Dry Density** Depth Percent Min Comp. Moisture Test# Of Date **Proctor ID** Method Classification (%) (pcf) (%) (pcf) (in) Compaction Tolerance (%) (%) Remark 8/4/15 03 **ASTM** A-4 14.0 116.0 15.9 110.4 В 95 95 -3/3 Pass D698 49 8/4/15 01 **ASTM** A-6 10.1 121.7 11.7 116.3 8 96 95 -1/3Pass D698 50 8/4/15 01 **ASTM** A-6 10.1 121.7 11.5 115.9 8 95 95 -1/3 Pass D698 51 8/4/15 01 **ASTM** 10.1 121.7 A-6 11.3 116.3 8 96 95 -1/3 Pass D698 52 8/4/15 01 **ASTM** A-6 10.1 121.7 10.9 115.7 8 95 95 -1/3 Pass D698 53 8/4/15 01 **ASTM** A-6 10.1 121.7 11.8 116.6 8 96 95 -1/3 Pass D698 **Test Information** 

	Domastic				the contract of the contract o
53	Sanitary Sewer Service: Alley A, 65' north of Manhole 156-28	6.0	BSG	Troxler 3430 33687	Płack, Ron
	Sanitary Sewer Service: Altey A, Station 2+98+27	3.0	BSG	Troxler 3430 33687	Plack, Ron
	Sanitary Sewer Service: Alley A, Station 2+93+27	3.0	BSG	Troxler 3430 33687	Plack, Ron
50	Sanitary Sewer Mainline, Alley A, 45' north of Manhole 156-28	3.0	BSG	Troxler 3430 33687	Plack, Ron
49	Sanitary Sewer Mainline, Alley A, 50' north of Manhole 156-28	5.0	BSG	Troxler 3430 33687	Plack, Ron
48	Sanitary Sewer Mainline, Alley A, 60' north of Manhole 156-28	7.0	BSG	Troxler 3430 33687	Plack, Ron
Test #	Test Location	Elevation	Reference		Field Technician
				Gauge	

Remarks	Comments		Related T	ests
Pass: Density Pass / Moisture Pass	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter" Gauge calibration data on file with the testing agency	Test #	Related Test #	Test Type
	53: The Contractor placed material in the main and services using a loader. Moisture was added with a water truck and a sheepsfoot wheel attached to a trackhoe mixed and applied compactive effort.			

### A.G. Wassenaar Consulting Engineers Geotechnical, Environmental

Field Services

2180 South Ivanhoa Street Suite 5 Deriver CO 80222 Phone (303) 759-8100

#### **Fill Testing**

Report #: FT-000009 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

Retest	Test Date 8/6/15 8/6/15 8/6/15 8/6/15	03 03 01 01 01	Method ASTM D698 ASTM D698 ASTM D698 ASTM D698 ASTM D698	Soil Classification A-4 A-4 A-6	Optimum Moisture (%) 14.0	Maximum Dry Density (pcf) 116.0 116.0	In Place Moisture (%) 15.6	In Place Dry Density (pcf) 111.4	Probe Depth (in) 8	Percent Compaction 96	Min Comp. (%) 95	Optimum Molsture Tolerance (%) -3/3	Remark Pass
	8/6/15 8/6/15	03 01 01	D698 ASTM D698 ASTM D698 ASTM	A-4 A-6	14.0	116.0	14.5						
	8/6/15	01	D698 ASTM D698 ASTM	A-6	10.00			112.3	8	97	95	-3/3	Dans
	8/6/15	01	D698 ASTM		10,1	121.7			- 1		"		F855
				4.0			9.4	119.3	8	98	95	-1/3	Pass
	8/6/15	04	1 0020	A-6	10.1	121.7	9.3	119.9	8	99	95	-1/3	Pass
		01	ASTM D698	A-6	10.1	121.7	9.6	120.4	8	99	95	-1/3	Pass
	8/6/15	01	ASTM D698	A-6	10.1	121.7	10.0	120.0	8	99	95	-1/3	Pass
	8/6/15	01	ASTM D698	A-6	10.1	121.7	10,7	119,7	8	98	95	-1/3	Pass
						Test Info	rmation						
est Loca	ation						Elevation	Reference				Field Tech	nician
anitary S	Sewer Mani	hole: Alley A, No	rth side of l	Manhole, 100' so	uth of Manho	le 156-28	5.0	BSG		Troxler	3430 33687	Plack, Ron	
anitary S	Sewer Mani	hole: Alley A, So	uth side of	Manhole, 100' so	uth of Manho	le 156-28	3.0	BSG		Troxler	3430 33687	Plack, Ron	
anitary S	Sewer Serv	rice: Alley A, Stal	ion 2+54+8	32			4.0	BSG		Troxler	3430 33687	Plack, Ron	
anitäry S	Sewer Serv	rice: Alley A, Stat	ion 2+35+3	38			3.0	BSG		Troxier	3430 33687	Plack, Ron	
anitary S	Sewer Serv	rice; Alley A, Stat	ion 2+30+3	38			3.0	BSG		Troxler	3430 33687	Plack, Ron	•
anitary S	Sewer Serv	rice: Alley A, Stat	ion 1+84+8	34			5.0	BSG		Troxler	3430 33687	Plack, Ron	
anitāry S	Sewer Main	nline: 170' north o	of Manhole	156+28			5.0	BSG		Troxler	3430 33687	Plack, Ron	
Remarks							Comments			1 5000	Relate	d Tests	
ss: Density Pass / Moisture Pass Test Gau 60:						ta on file with the r placed fill in th	testing agency ie main and s	services using a	loader.	Test#	Related Test	# Test	Туре
ai ai ai	nitary 5 nitary 5 nitary 5 nitary 5 nitary 5 nitary 5	st Location nitary Sewer Man nitary Sewer Serv nitary Sewer Main	st Location  nitary Sewer Manhole: Alley A, No nitary Sewer Manhole: Alley A, So nitary Sewer Service: Alley A, Stal nitary Sewer Mainline: 170' north of Remarks	8/6/15 01 ASTM D698  St Location  Initary Sewer Manhole: Alley A, North side of nitary Sewer Manhole: Alley A, South side of nitary Sewer Service: Alley A, Station 2+54+8 nitary Sewer Service: Alley A, Station 2+35+3 nitary Sewer Service: Alley A, Station 2+30+3 nitary Sewer Service: Alley A, Station 1+84+8 nitary Sewer Mainline: 170' north of Manhole Remarks	8/6/15 01 ASTM A-6 D698 A-6 D6	8/6/15 01 ASTM A-6 10.1  St Location  Initiary Sewer Manhole: Alley A, North side of Manhole, 100' south of Manhol	Test Info  St Location  Initiary Sewer Manhole: Alley A, North side of Manhole, 100' south of Manhole 156-28  Initiary Sewer Manhole: Alley A, South side of Manhole, 100' south of Manhole 156-28  Initiary Sewer Service: Alley A, Station 2+54+82  Initiary Sewer Service: Alley A, Station 2+35+38  Initiary Sewer Service: Alley A, Station 2+30+38  Initiary Sewer Service: Alley A, Station 2+30+38  Initiary Sewer Mainline: 170' north of Manhole 156+28  Remarks  Sity Pass / Moisture Pass  Tests are "Direct Transmission" (Methodauge calibration data on file with the Go: The Contractor placed fill in the Moisture was added with a fire ho	Test Information  St Location  Elevation  St Location  Elevation  St Journal	Test Information  Location  Litary Sewer Manhole: Alley A, North side of Manhole, 100' south of Manhole 156-28  Litary Sewer Manhole: Alley A, South side of Manhole, 100' south of Manhole 156-28  Litary Sewer Manhole: Alley A, South side of Manhole, 100' south of Manhole 156-28  Litary Sewer Service: Alley A, Station 2+54+82  Litary Sewer Service: Alley A, Station 2+35+38  Litary Sewer Service: Alley A, Station 2+35+38  Litary Sewer Service: Alley A, Station 2+30+38  Litary Sewer Service: Alley A, Station 1+84+84  Litary Sewer Mainline: 170' north of Manhole 156+28  Litary Sewer Manhole: 156-28  Lita	Test Information  Location  Literation  Levation  Elevation  Elevation  Reference  Diary Sewer Manhole: Alley A, North side of Manhole, 100' south of Manhole 156-28  Diary Sewer Manhole: Alley A, South side of Manhole, 100' south of Manhole 156-28  Diary Sewer Service: Alley A, Station 2+54+82  Diary Sewer Service: Alley A, Station 2+35+38  Diary Sewer Service: Alley A, Station 2+30+38  Diary Sewer Service: Alley A, Station 2+30+38  Diary Sewer Service: Alley A, Station 1+84+84  Diary Sewer Mainline: 170' north of Manhole 156+28  Location  Elevation  Reference  BSG  3.0 BSG  DIARY Sewer Service: Alley A, Station 2+30+38  Diary Sewer Service: Alley A, Station 2+30+38  Diary Sewer Mainline: 170' north of Manhole 156+28  Location  Elevation  Reference  3.0 BSG  DIARY Sewer Service: Alley A, Station 2+30+84  Diary Sewer Service: Alley A, Station 2+30+84  Diary Sewer Mainline: 170' north of Manhole 156+28  Location  Elevation  Reference  3.0 BSG  DIARY Sewer Service: Alley A, Station 2+30+84  Diary Sewer Service: Alley A, Station 2+30+84  Diary Sewer Mainline: 170' north of Manhole 156+28  Diary Sewer Mainline: 170' north of Manhole 156+28  Diary Sewer Mainline: 170' north of Manhole 156+28  Comments  Comments  Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter Gauge calibration data on file with the testing agency  Go: The Contractor placed fill in the main and services using a loader. Moisture was added with a fire hose attached to a water truck, and a	Test Information  Trokler Make / Mak	Section   Sect	Test Information    St Location   Field Technolitary Sewer Manhole: Alley A, North side of Manhole, 100' south of Manhole 156-28   5.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Service: Alley A, Station 2+34-82   4.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Service: Alley A, Station 2+35-38   3.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Service: Alley A, Station 2+35-48   3.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Service: Alley A, Station 2+35-48   3.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Service: Alley A, Station 2+30-38   3.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Service: Alley A, Station 2+30-38   3.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Service: Alley A, Station 1+84-84   5.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Mainline: 170' north of Manhole 156+28   5.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Mainline: 170' north of Manhole 156+28   5.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Mainline: 170' north of Manhole 156+28   5.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Mainline: 170' north of Manhole 156+28   5.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Mainline: 170' north of Manhole 156+28   5.0   BSG   Troxler 3430 33687   Plack, Ron nitary Sewer Mainline: 170' north of Manhole 156+28   Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"   Test # Related Tests   Test # Related Tests   Test # Related Tests   Test # Related Tests   Test # Related Test # Test   Test # Te



Report #: FT-000010 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phona, (303) 759-8100

													_	
							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Moisture Tolerance (%)	Remark
61		8/7/15	03	ASTM D698	A-4	14.0	116.0	15.9	110.3	8	95	95	-3/3	Pass
62		8/7/15	03	ASTM D698	A-4	14,0	116.0	16.2	105,1	8	91	95	-3/3	Fail
63	62	8/7/15	03	ASTM D698	A-4	14.0	116.0	16.0	110.7	8	95	95	-3/3	Pass
64		8/7/15	03	ASTM D698	A-4	14_0	116.0	14.3	110,9	8	96	95	-3/3	Pass
65		8/7/15	03	ASTM D698	A-4	14.0	116.0	14.8	111.6	8	96	95	-3/3	Pass
66		8/7/15	03	ASTM D698	A-4	14.0	116.0	14.0	110.5	8	95	95	-3/3	Pass
67		8/7/15	03	ASTM D698	A-4	14.0	116.0	14.5	111.3	8	96	95	-3/3	Pass
68		8/7/15	03	ASTM D698	A-4	14.0	116.0	15,1	110.8	8	96	95	-3/3	Pass
							Test info	rmation						
Test #	Test Lo	cation						Elevation	Reference			auge Model / SN	Field Tech	nician
61			hole: West 68th					4.0	BSG		Troxler	3430 33687	Plack, Ren	
62			hole: West 68th					2.0	BSG			3430 33687	Plack, Ren	
63			hole: West 68th	-				2.0	BSG			3430 33687	Plack, Ron	
64			hole: West 68th			156-54		1.0	BSG			3430 33687	Plack, Ron	
65 66			rice: Alley A, Stat rice: Alley A, Stat					1.0	BSG			3430 33687	Plack, Ron	
67			rice: Alley A, Stat					3.0	BSG			3430 33687	Plack, Ron	
68			iline: Alley A, 3tat		_			4.0	BSG			3430 33687 3430 33687	Plack, Ron	
- 00	Calintaly			SOULI OI MIS	aililione 150-55				1000		Hoxier			
Donnell	3515 D		temarks		7	*Di T		Comments		l MDl44-		Relate	d Tests	
	1 12	ass / Moistu I / Moisture					nsmission" (Methi ta on file with the		obe depth is noted	i as "Hackscatte	Test#	Related Test	# Test	Туре



Report #: FT-000010 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South franhoe Street, Suite 5 Deriver CO 80222 Phone: (303) 759-8100

							Test R	esults						
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Molsture Tolerance (%)	Remark
69		8/7/15	03	ASTM D698	A-4	14.0	116.0	14.9	111.0	8	96	95	-3/3	Pass
							Test Info	rmation						
Test#	Test Loc	ation				-		Elevation	Reference			Sauge Model / SN	Field Tech	nician
69	Sanitary	Sewer Main	line. Alley A, 45	' south of M	anhole 156-53			2,0	BSG		Troxler	3430 33687	Plack, Ron	
	1	R	emarks					Comments				Relate	ed Tests	
Pass: (	Density Pa	ss / Moislu	re Pass				nsmission" (Metho ta on file with the		obe depth is noted	as "Backscatter	Test #	Related Tes	t# Test	Туре
	Ш				No a	dditional mois		l and a sheep	and services us esfoot wheel atta					

### A.G. Wassenaar

Consulting Engineers
Geotechnical, Environmental
and Related Services

Flekt Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone: (303) 759-8100

#### **Fill Testing**

Report #: FT-000011 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

							Test R	tesults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
70		8/10/15	01	ASTM D698	A-6	10,1	121.7	10_0	120,1	8	99	95	-1/3	Pass
71		8/10/15	03	ASTM D698	A-4	14.0	116.0	14.3	112.8	8	97	95	-3/3	Pass
72		8/10/15	03	ASTM D698	A-4	14.0	116.0	15.4	113,6	8	98	95	-3/3	Pass
73		8/10/15	03	ASTM D698	A-4	14.0	116.0	15.7	111,9	8	96	95	-3/3	Pass
74	4 8/10/15 03 ASTM A-4 14.0 1							15,8	112.3	8	97	95	-3/3	Pass
	TЩ						Test Info	ormation						72-11
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Techi	nician
70	Water M	sin: West 68	ith Place, 150' w	est of Joyc	e Street			1.0	BSG		Troxler	3430 33687	Plack, Ron	
71	Sanitary	Sewer Serv	ice: West of Alle	y A, Station	0+60_13			2.0	BSG		Troxler	3430 33687	Plack, Ron	_
72			ice: West of Alle					4.0	BSG	-	Troxler	3430 33687	Plack, Ron	
73	Sanitary	Sewer Main	line: West of All	ey A at Stat	ion 0+60 <sub>.</sub> 0			2,0	BSG		Troxler	3430 33687	Plack, Ron	
74	Sanitary	Sewer Main	line: West of All	ey A at Stat	ion 0+76 0			4.0	BSG		Troxler	3430 33687	Plack, Ron	
	111	R	emarks					Comments				Relate	d Tests	
Pass: (	Density Pa	ıss / Moistur	e Pass		Gauge	calibration da	a on file with the	testing agency			Test #	Related Test		Туре
				_	Moist	ure was adde	d with a fire ho	se attached t	and services us o a water truck a d and applied co	and a				

## A.G. Wassenaar Consulting Engineers Geolachnical, Environmental and Related Services

**Fill Testing** 

Report #: FT-000012 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone: (303) 759-8100

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
75		8/11/15	03	ASTM D698	A-4	14.0	116.0	15,7	110,4	8	95	95	-3/3	Pass
76		8/11/15	03	ASTM D698	A-4	14.0	116.0	14.9	102,7	8	89	95	-3/3	Fail
77		8/11/15	03	ASTM D698	A-4	14.0	116.0	15.1	111.4	8	96	95	-3/3	Pass
78	12	8/11/15	03	ASTM D698	A-4	14.0	116.0	14.8	103.6	8	89	95	-3/3	Fail
79	76	8/11/15	03	ASTM D698	A-4	14.0	116.0	15,0	111.0	8	96	95	-3/3	Pass
80	78 8/11/15 03 ASTM A-4 14.0 1							15.0	111.0	8	96	95	-3/3	Pass
81	8/11/15 03 ASTM A-4 14.0 1 D698							15.3	110.5	8	95	95	-3/3	Pass
82		8/11/15	01	ASTM D698	A-6	10,1	121,7	11.1	115,7	8	95	95	-1/3	Pass
							Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
75	<u>_</u>		ce West of Alle				•	4.0	BSG		Troxler	3430 33687	Plack, Ron	
76	Sanitary	Sewer Serv	ice: West of Alle	y A, Station	1+10.33			5.0	BSG		Troxler	3430 33687	Plack, Ron	
77			line: West of Alf	<del></del>				4.0	BSG		Troxler	3430 33687	Plack, Ron	
78			line: West of All					5,0	BSG		Troxler	3430 33687	Plack, Ron	
79			ce West of Alle					5,0	BSG		Troxler	3430 33687	Plack, Ron	
80			line: West of All					5,0	BSG		Troxler	3430 33687	Plack, Ron	
81					Manhole 156-53			5.0	BSG		Troxler	3430 33687	Plack, Ron	
82	Water M	ain. West 68	th Place, 600' w	est of Joyc	e Street			1,0	BSG		Troxler	3430 33687	Plack, Ron	
	1 13	R	emarks		300 650			Comments				Relate	d Tests	
		ss / Moislur / Moisture F			Tests Gauge	are "Direct Trai calibration dat	nsmission" (Metho a on file with the	od A) unless po testing agency	obe depth is noted	l as "Backscatter	Test #	Related Test	# Test	Туре



Report #: FT-000012 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:
Cottonwood Park West, LLC
1240 Lehigh Street

Boulder, CO 80305

Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Deriver, CO 80222

Phone: (303) 759-8100

							Test R	esults						
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Molsture Tolerance (%)	Remark
83		8/11/15	03	ASTM D698	A-4	14.0	116.0	14.2	110.3	8	95	95	-3/3	Pass
84		8/11/15	03	ASTM D698	A-4	14.0	116.0	14.5	106.7	8	92	95	-3/3	Fail
85	84 8/11/15 03 ASTM A-4 14.0 D698							14.7	110.2	8	95	95	-3/3	Pass
							Test Info	rmation		= - II				7 = 10
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
83	Sanitary	Sewer Main	line West of All	ey A at Stat	ion 0+95.0			1.0	BSG		Troxler	3430 33687	Plack, Ron	
84	Sanitary	Sewer Mani	hole: Alley A, W	est side of N	Manhole 156-53			2.0	BSG		Troxler	3430 33687	Plack, Ron	
85	Sanitary	Sewer Man	hole: Alley A, W	est side of I	lanhole 156-53		•	2.0	BSG		Troxler	3430 33687	Plack, Ron	
	1 4	R	emarks				(	Comments				Relate	ed Tests	
Pass: [	Density Pass / Moisture Pass  Tests are "Direct Transmiss Gauge calibration data on fi									l as "Backscatte	Test #	Related Tes	t# Test	Туре
Fail: De	Gauge calibrationsity Fail / Moisture Pass 85: The Col Moisture wa					ure was adde	ed with a fire ho	se attached t	services using a to a water truck a d and applied co	and a				



Report #: FT-000013 Report Date: 8/18/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Deriver, CO 80222 Phone: (303) 759-8100

							Test R	esults						
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
86		8/12/15	01	ASTM D698	A-6	10,1	121.7	11.0	119.4	8	98	95	-1/3	Pass
87		8/12/15	01	ASTM D698	A-6	10,1	121.7	10.2	120,6	8	99	95	-1/3	Pass
88		8/12/15	01	ASTM D698	A-6	10.1	121.7	10.1	117.9	8	97	95	-1/3	Pass
	¥ 16						Test Info	ormation						
Test#	Test Loc	ation						Elevation	Reference			auge Model / SN	Field Tech	nician
86	Water M	ain: West 68	8th Place, 155' e	ast of Kilme	r Street			2.0	BSG		Troxler	3430 33687	Plack, Ron	
87	Water Va	ilve: West 6	8th Place, West	side of valv	e, 150' East of I	Kilmer Street		2.0	BSG		Troxler	3430 33687	Plack, Ron	
88	Water M	ain: West 68	8th Place, 165' e	ast of Kilme	r Street			0.0	TSG		Troxler	3430 33687	Plack, Ron	
	4 1 5	R	lemarks					Comments		-1-01		Relate	ed Tests	
Pass: (	s: Density Pass / Moisture Pass  Tests are "Direct Transmission Gauge calibration data on file v									l as "Backscatte	Test#	Related Tes	t# Test	Туре
					adde	ed using a fire		to a water tru	ch using a loader ick and a sheeps pactive effort.		3			



Report #: FT-000014 Report Date: 8/18/2015 Test Method: ASTM D 6938

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Client:

Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

Field Services 2180 South Ivanhoe Street Suite 5 Denver, CO 80222

Phone (303) 759-8100

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
89		8/13/15	03	ASTM D698	A-4	14.0	116.0	14.5	111.8	8	96	95	-3/3	Pass
							Test Info	rmation						
Test#	Test Loc	cation						Elevation	Reference			auge Model / SN	Field Tech	nician
89	Water M	ain: West 69	th Avenue, 10' r	north of Juni	per Court			1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
		R	emarks					Comments				Relate	ed Tests	
Pass: [	Density Pa	ass / Moistur	re Pass				nsmission" (Metho ta on file with the		obe depth is noted	l as "Backscatter	Test#	Related Tes	t# Test	Туре
									wheel attachme o moisture was		II.		<del>-,;</del>	

### A.G. Wassenaar

Consulting Engineers
Geotechnical, Environmental
and Related Services

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone: (303) 759-8100

#### **Fill Testing**

Report #: FT-000015 Report Date: 8/18/2015

Test Method: ASTM D 6938

Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soli Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	in Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
90		8/14/15	03	ASTM D698	A-4	14.0	116.0	15.2	109.9	8	95	95	-3/3	Pass
91		8/14/15	03	ASTM D698	A-4	14.0	116.0	16.0	110.2	8	95	95	-3/3	Pass
92		8/14/15	03	ASTM D698	A-4	14.0	116.0	15.7	110.9	8	96	95	-3/3	Pass
93								11.5	119.4	8	98	95	-1/3	Pass
							Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
90	Water M	ain: Juniper	Court, 25 north	of West 69	th Avenue			1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	,
91	Water Ma	ain. Juniper	Court, 100' norti	n of West 6	9th Avenue			2.0	BSG		InstroTe	k 3500 1910	Blom, Doug	,
92	Water Ma	ain: Juniper	Court, 125' norti	n of West 6	9th Avenue			1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
93	Water Ma	ain: Juniper	Court, 50' north	of West 68	th Place			1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	,
	8 14	R	emarks					Comments				Relate	d Tests	
Pass: [	Density Pa	ass / Moistui	e Pass		Gauge 93: Ti	calibration da he Contracto	ta on file with the rutilized an exc	testing agency avalor with a	obe depth is noted in wheel attachme loisture was app	ent to apply	Test#	Related Test	# Test	Туре

A.G. Wassenaar

Consulting Engineers
Geotechical, Environmental
and Related Services

**Fill Testing** 

Report #: FT-000016 Report Date: 8/31/2015 Test Method: ASTM D 6938 Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Client:

Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Deriver, CO 80222 Phone (303) 759-8100

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
94		8/17/15	03	ASTM D1557	A-4	14.0	116.0	13.5	110.0	8	95	95	-3/3	Pass
	1 III						Test info	rmation	الساورا					-1 -1
Test#	Test Loc	ation		-				Elevation	Reference			Sauge Model / SN	Field Tech	nician
94	Storm Se	ewer Main: V	Vest 69th Place	, 25' north o	f Tract B			2.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
		R	emarks					Comments				Relati	ed Tests	
Pass: [	Remarks  Density Pass / Moisture Pass  Tests are "Direct Transmission Gauge calibration data on file  Put The Contractor utilized									as "Backscatter	Test #	Related Tes	t# Test	Туре
									wheel attachme					

Field Services 2160 South Ivanhoe Street Suite 5

Denver, CO 80222 Phone (303) 759-8100

#### **Fill Testing**

Report #: FT-000017 Report Date: 8/31/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project:

144725UF Geos Neighborhood 69th and Joyce Street

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
95		8/18/15	01	ASTM D698	A-6	10.1	121.7	12.0	119.4	В	98	95	-1/3	Pass
96		8/18/15	01	ASTM D698	A-6	10.1	121.7	11.9	117.1	8	96	95	-1/3	Pass
							Test Info	rmation	No.					
Test #	Test Loc	ation						Elevation	Reference			lauge Model / SN	Field Tech	nician
95	Storm Se	ewer Main: J	uniper Court, 75	s' south of V	Vest 69th Place			1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
96	Storm Se	wer Main: J	uniper Court, 10	00' south of	West 69th Place			3.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
		R	emarks				- (	Comments				Relati	ed Tests	
Pass: (	Remarks  Density Pass / Moisture Pass  Tests are "Direct Transmission' Gauge calibration data on file w 96: The Contractor utilized compactive effort to the utili							testing agency			Test #	Related Tes	t# Test	Туре

# Consulting Engineers Geolechnical, Environmental

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone (303) 759-8100

#### **Fill Testing**

Report #: FT-000018 Report Date: 8/31/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

		M					Test R	esults			11 × 170			
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
97		8/19/15	03	ASTM D1557	A-4	14.0	116.0	14.3	114.5	8	99	95	-3/3	Pass
98		8/19/15	03	ASTM D1557	A-4	14.0	116,0	15.4	111.0	8	96	95	-3/3	Pass
99		8/19/15	03	ASTM D1557	A-4	14:0	116.0	14.9	112.0	8	97	95	-3/3	Pass
100		8/19/15	03	ASTM D1557	A-4	14.0	116.0	15.7	110.1	8	95	95	-3/3	Pass
101		8/19/15	03	ASTM D1557	A-4	14,0	116.0	16.1	109,8	8	95	95	-3/3	Pass
102	8/19/15 03 ASTM A-4 14.0 D1557							14.5	112.1	8	97	95	-3/3	Pass
103	8/19/15 03 ASTM A-4 14.0 1 D1557							15.6	110.6	8	95	95	-3/3	Pass
104		8/19/15	03	ASTM D1557	A-4	14,0	116.0	15.1	110,3	8	95	95	-3/3	Pass
							Test Info	rmation						
Test #	Test Loc	ation						Elevation	Reference		Make /	Sauge Model / SN	Fleid Tech	nician
97	Storm Se	ewer Manho	le: West 69th Pl	ace, north o	FSTM MH 13			3,0	BSG		InstroTe	k 3500 1910	Blom, Doug	1
98	Storm Se	ewer Manho	le: West 69th PI	ace, south o	FSTM MH 13			2.0	BSG		InstroTe	k 3500 1910	Blom, Doug	<u> </u>
99			Vest 69th Place					20	BSG		InstroTe	k 3500 1910	Blom, Doug	,
100	Storm Se	ewer Main; V	Vest 69th Place	, 10' west of	STM MH 2			1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	,
101			le: West 69th PI					3.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
102			le: West 69th PI					1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	j
103			le: West 69th PI		STM MH 13			1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	l.
104	Storm Se	ewer Manho	le: West of STM	MH 13		:		1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
		R	emarks					Comments				Relate	d Tests	
Pass: (	Density Pa	ass / Moistu	re Pass				nsmission" (Metho a on file with the		obe depth is noted	as "Backscatter	Test #	Related Test	# Test	Туре
									a wheel attachn loisture was app					



Report #: FT-000019 Report Date: 10/30/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone (303) 759-8100

	11						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	in Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
105		8/21/15	03	ASTM D1557	A-4	14.0	116.0	15.7	112.4	8	97	95	-3/3	Pass
106		8/21/15	03	ASTM D1557	A-4	14.0	116.0	14.9	111.7	8	96	95	-3/3	Pass
107		8/21/15	03	ASTM D1557	A-4	14.0	116.0	14.6	111.8	В	96	95	-3/3	Pass
108		8/21/15	03	ASTM D1557	A-4	14.0	116.0	14.5	113.8	8	98	95	-3/3	Pass
109								17.5	106.0	8	97	95	-1/3	Pass
	#						Test Info	ormation						
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
105	Storm Se	wer Main, J	luniper Court, 10	)' south of S	TM MH 12-1			3.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
106	Storm Se	wer Main: J	luniper Court, 20	)' south of S	TM MH 12-1			1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
107	Storm Se	wer Main: J	luniper Court, 25	o' north of S	TM MH 12			2.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
108	Storm Se	wer Main: J	luniper Court, 20	)' north of S	TM MH 12			1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
109	Storm Se	wer Main: J	luniper Court, 15	' North of S	TM MH 12			5.0	BTFW		InstroTe	k 3500 1910	Blom, Doug	
	1 1	R	emarks					Comments			U.S.	Relate	d Tests	
Pass: [	Density Pa	ss / Moistu	re Pass		Tests Gauge	are "D rect Trai calibration da	nsmission" (Methe la on file with the	od A) unless pr testing agency	obe depth is noted	as "Backscatter	Test #	Related Test	# Test	Туре
									a wheel attachm loisture was add					

## A.G. Wassenaar Consulting Engineers Geotechnical, Environmental

Fill Testing

Report #: FT-000020 Report Date: 10/30/2015 Test Method: ASTM D 6938

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Client:

Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

#### Field Services 2180 South Ivanhoe Street, Suite 5 Denver. CO 80222 Phone: (303) 759-8100

							Test R	lesuits						
Test#	Retest	Test Date	Proctor ID	Method	Soil Classification	Optimum Molsture (%)	Maximum Dry Density (pcf)	in Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Moisture Tolerance (%)	Remark
110		8/25/15	02	ASTM D698	A-6	15.8	109.1	14.8	109.1	8	100	95	-1/3	Pass
111		8/25/15	02	ASTM D698	A-6	15.8	109.1	15.7	108.2	8	99	95	-1/3	Pass
112	1	8/25/15	03	ASTM D1557	A-4	14.0	116.0	14.6	110.6	8	95	95	-3/3	Pass
113		8/25/15	03	ASTM D1557	A-4	14 0	116.0	14,3	111.2	8	96	95	-3/3	Pass
114		8/25/15	03	ASTM D1557	A-4	14.0	116.0	14.8	111.1	8	96	95	-3/3	Pass
115		8/25/15	03	ASTM D1557	A-4	14.0	116.0	13.7	111.6	8	96	95	-3/3	Pass
116		8/25/15	03	ASTM D1557	A-4	14.0	116.0	14,8	107.2	8	92	95	-3/3	Fail
117	116	8/25/15	03	ASTM D1557	A-4	14_0	116,0	15.1	110.1	8	95	95	-3/3	Pass
							Test Info	rmation				1100000		
Test#	Test Loc	cation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
110	Storm Se	ewer Manho	le: West 69th Av	enue, west	of STM MH 11			0.0	TSG		InstroTe	k 3500 1910	Blom, Doug	
111	Storm Se	ewer Manho	le: West 69th Av	enue, east	of STM MH 11		<del>-</del>	1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	_
112	Storm Se	ewer Main: V	Vest 69th Avenu	re, 25' west	of STM MH 12		_	2.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
113	Storm Se	ewer Main: V	Vest 69th Avenu	ie, 10' west	of STM MH 12		-	1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
114	Storm Se	ewer Manho	le: West 69th Av	enue, west	of STM MH 12	· ·		2.0	BSG	i	InstroTe	k 3500 1910	Blom, Doug	
115			le: West 69th Av					1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
116	Storm Sewer Manhole: West 69th Avenue, east of STM MH 12							0.0	TSG		InstroTe	k 3500 1910	Blom, Doug	
117	Storm Se	ewer Manho	le: West 69th Av	/enue, east	of STM MH 12			0.0	TSG		InstroTe	k 3500 1910	Blom, Doug	
	Remarks					Comments						Relate	d Tests	
Pass: (	Density Pa	ass / Moistui	re Pass		Tests a Gauge	re "Direct Trar calibration dat	nsmission" (Metho a on file with the	od A) unless pr testing agency	obe depth is noted	as "Backscatter	Test #	Related Test		Туре
Fail: Do	ensity Fail	I / Moisture I	Pass		attach	The Contractor ment to appl d to the fill.	or, E-Z Excavat y compactive e	ing, utilized a	an excavator with	n a wheel ill. Moisture wa	is			



Report #: FT-000021

Report Date: 10/30/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street

Boulder, CO 80305

Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone (303) 759-8100

	8 11						Test R	esuits						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
118		8/26/15	02	ASTM D698	A-6	15.8	109.1	18.7	105.0	8	96	95	-1/3	Pass
119		8/26/15	02	ASTM D698	A-6	15 8	109.1	17.9	105.8	8	97	95	-1/3	Pass
120		8/26/15	02	ASTM D698	A-6	15.8	109.1	17.3	105.3	8	97	95	-1/3	Pass
	A 1/4		santasailus.				Test Info	rmation						
Test #	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
118	Storm Se	wer Main: J	luniper Court, 10	)' north of S	TM MH 12		<u> </u>	1,0	BSG		InstroTe	k 3500 1910	Blom, Doug	1
119	Storm Se	wer Manho	le: Juniper Cour	t, north of S	TM MH 12			2.0	BSG		InstroTe	k 3500 1910	Blom, Doug	]
120	20 Storm Sewer Manhole Juniper Court, south of STM MH 12							1.0	BSG		InstroTe	k 3500 1910	Blom. Doug	1
		R	emarks	100				Comments				Relate	ed Tests	
Pass: (	Density Pa	ıss / Moistu	re Pass		Gauge	calibration dat	a on file with the	testing agency			Test #	Related Tes	t# Test	Туре
									a wheel attachmoisture was app					

## A.G. Wassenaar Consulting Engineers Geotechnical, Environmental and Related Services

Field Services

Denver CO 80222 Phone (303 759-8100

2180 South (vanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000022 Report Date: 10/30/2015

Test Method: ASTM D 6938

Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF

Geos Neighborhood 69th and Joyce Street

	TOTAL T						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soll Classification	Optimum Molsture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcl)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
121		9/11/15	03	ASTM D1557	A-4	14.0	116.0	13.7	112.0	8	97	95	-3/3	Pass
122		9/11/15	03	ASTM D1557	A-4	14.0	116,0	14.1	113.0	8	97	95	-3/3	Pass
123		9/11/15	03	ASTM D1557	A-4	14.0	116.0	11.5	115.7	8	100	95	-3/3	Pass
124		9/11/15	03	ASTM D1557	A-4	14.0	116.0	13.8	113,4	8	98	95	-3/3	Pass
125		9/11/15	03	ASTM D1557	A-4	14.0	116.0	14.8	111.0	8	96	95	-3/3	Pass
126		9/11/15	03	ASTM D1557	A-4	14.0	116.0	13.2	112.1	8	97	95	-3/3	Pass
	1 3						Test info	rmation						
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Fleid Tech	nician
121			Station 5+08.93,					1.0	BSG		InstroTe	k 3500 1910	Blom, Doug	
122		<u> </u>	Station 5+08,93					0.0	TSG		InstroTe	ek 3500 1910	Blom, Doug	ı
123					5,60, north of stor			1.0	BSG			ek 3500 1910	Blom, Doug	1
124			111		5 60 east of storr			0.0	TSG			k 3500 1910	Blom, Doug	1
125								1.0	BSG			k 3500 1910	Blom, Doug	<u> </u>
126	Inlet. We	st 68th Plac	e, South Inlet, S	tation 17+6	5 60, west of stor	m inlet		0.0	TSG		InstroTe	k 3500 1910	Blom, Doug	1
		R	emarks					Comments				Relate	d Tests	
Pass: (	Density Pa	ıss / Moistur	e Pass		Gauge	calibration dat	a on file with the	testing agency			Test #	Related Test	# Test	Туре
					attach				en excavator with		ıs			

## A.G. Wassenaar Consulting Engineers Geotechnical, Environmental and Related Services

**Fill Testing** 

Report #: FT-000023 Report Date: 12/15/2015 Test Method: ASTM D 6938

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Client:

Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Deriver CO 80222 Phone: (303) 759-8100

		-					Test R	esults						
Test#	Retest	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
127		11/10/15	01	ASTM D698	A-6	10.1	121.7	12.5	118.4	8	97	95	-1/3	Pass
128	Į Į	11/10/15	03	ASTM D1557	A-4	14.0	116.0	14.1	110.4	8	95	95	-3/3	Pass
129		11/10/15	03	ASTM D1557	A-4	14.0	116.0	16.2	112.9	8	97	95	-3/3	Pass
130		11/10/15	03	ASTM D1557	A-4	14.0	116.0	16.2	112.9	8	97	95	-3/3	Pass
131		11/10/15	02	ASTM D698	A-6	15.8	109.1	14.9	107.7	8	99	95	-1/3	Pass
132		11/10/15	03	ASTM D1557	A-4	14.0	116.0	13.2	113.1	8	98	95	-3/3	Pass
133		11/10/15	03	ASTM D1557	A-4	14.0	116.0	13.8	113.5	8	98	95	-3/3	Pass
134		11/10/15	03	ASTM D1557	A-4	14,0	116.0	14.4	113.8	8	98	95	-3/3	Pass
						4	Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference	-		auge	Field Teeb	nlalan
		nch Backfill	Water Service	West 69th	Place, eastbound	d, first service	e east of	2.0	BSG				Field Technician Haidak, Jake	
128	Utility Tro Juniper (	nch Backfill Court	Water Service,	West 69th	Place, eastbound	d, second ser	vice east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	е
129	Utility Tro Juniper (		: Water Service,	West 69th	Place, eastbound	d, third servic	e east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	e
130	Utility Tro Juniper (	ench Backfill Court	: Water Service,	West 69th	Place, eastbound	d, fourth serv	ce east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	e
131	Utility Trench Backfill: Water Service, Juniper Court, northbound, first service south of West 69th Place						outh of West	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	е
132	Utility Trench Backfill: Water Service, Juniper Court, northbound, second service south of West 69th Place							2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	e
133	Utility Trench Backfill: Water Service, Juniper Court, northbound, third service south of We 69th Place							2.0	BSG		InstroTek 3500 1937		Haidak, Jake	
134	Utility Tre West 69t		: Water Service,	Juniper Co	urt, northbound,	fourth service	south of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	е

A representative of the Contractor was informed of our test results and observations. Observation services were conducted on an on-call basis. The test depths and locations are approximate and are based upon information provided by the Contractor. The lateral and vertical extents of any subexcavation were not measured or verified by this firm. The site conditions noted and test results reported apply only to the locations and depths tested at the time of our visit. It remains the Contractor's responsibility to apply the necessary compactive effort and moisture conditioning to meet the project specifications.



Report #: FT-000023

Report Date: 12/15/2015 Test Method: ASTM D 6938 Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone (303) 759-8100

Remarks	Comments		Related T	ests
	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"			
J. 182	Gauge calibration data on file with the testing agency	Test #	Related Test #	Test Type

Client:



Field Services

Denver CO 80222 Phone (303) 759-8100

2180 South Ivanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000023 Report Date: 12/15/2015

Test Method: ASTM D 6938

Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

	T. LIE													
	ior.						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	in Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
135		11/10/15	03	ASTM D1557	A-4	14.0	116.0	14_0	113.0	8	97	95	-3/3	Pass
136		11/10/15	03	ASTM D1557	A-4	14.0	116.0	13.7	113.4	8	98	95	-3/3	Pass
137		11/10/15	03	ASTM D1557	A-4	14.0	116.0	14.2	112.8	8	97	95	-3/3	Pass
138		11/10/15	03	ASTM D1557	A-4	14.0	116.0	14,1	114.1	8	98	95	-3/3	Pass
139		11/10/15	01	ASTM D698	A-6	10,1	121.7	12.0	117.2	8	96	95	-1/3	Pass
140		11/10/15	01	ASTM D698	A-6	10,1	121,7	11,7	118.1	8	97	95	⊕1/3	Pass
141		11/10/15	03	ASTM D1557	A-4	14.0	116.0	13,9	113.8	8	98	95	-3/3	Pass
142	~	11/10/15	01	ASTM D698	A-6	10,1	121.7	12,7	117,7	8	97	95	-1/3	Pass
							Test info	rmation						
Test#	Test Lo	cation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
135	Utility Tr 69th Pla	ench Backfill ce	: Water Service	, Juniper Co	ourt, northbound,	fifth service s	south of West	2,0	BSG		InstroTe	k 3500 1937	Haidak, Jal	(e
136	Utility Tr West 69		Water Service	Juniper Co	ourt, northbound,	eighth servic	e south of	2,0	BSG		InstroTe	ek 3500 1937	Haidak, Jal	(e
137	Utility Tr 69th Pla		: Water Service	, Juniper Co	ourt, northbound,	ninth service	south of West	2.0	BSG		InstroTe	ek 3500 1937	Haidak, Jal	(e
138	Utility Trench Backfill: Water Service, Juniper Court, northbound, 10th service south of W							2.0	BSG		InstroTe	k 3500 1937	Haidak, Jal	(e
139	Utility Trench Backfill: Water Service, Juniper Court, northbound, 11th service south of We 69th Place						south of West	2.0	BSG		InstroTe	ek 3500 1937	Haidak, Jal	(e
140	Utility Trench Backfill: Water Service, Juniper Court, northbound, 12th service south of We 69th Place						south of West	2.0	BSG		InstroTe	ek 3500 1937	Haidak, Jal	(e
141	Utility Trench Backfill: Water Service, Juniper Court, northbound, 13th service south of We 69th Place							2,0	BSG		InstroTe	ek 3500 1937	Haidak, Jal	ке
142							e east of	2.0	BSG		InstroTe	ek 3500 1937	Haidak, Jal	ке

A representative of the Contractor was informed of our test results and observations. Observation services were conducted on an on-call basis. The test depths and locations are approximate and are based upon information provided by the Contractor. The lateral and vertical extents of any subexcavation were not measured or verified by this firm. The site conditions noted and test results reported apply only to the locations and depths tested at the time of our visit. It remains the Contractor's responsibility to apply the necessary compactive effort and moisture conditioning to meet the project specifications.



Fleid Services 2180 South Ivanhoe Street, Suite 5

Denver, CO 80222 Phone (303) 759-8100

#### **Fill Testing**

Report #: FT-000023 Report Date: 12/15/2015 Test Method: ASTM D 6938 Client: Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project: 144725UF Geos Neighborhood 69th and Joyce Street

Remarks	Comments	Related Tests					
Pass: Density Pass / Moisture Pass	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter" Gauge calibration data on file with the testing agency	Test #	Related Test #	Test Type			



Report #: FT-000023 Report Date: 12/15/2015 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone. (303) 759-8100

							Test R	esults						
Test #	Retest Of	Test Date	Proctor ID	Method	Soli Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Moisture Tolerance (%)	Remark
143		11/10/15	03	ASTM D1557	A-4	14.0	116.0	12.0	114.8	8	99	95	-3/3	Pass
144		11/10/15	03	ASTM D1557	A-4	14.0	116.0	13.1	114.2	8	98	95	-3/3	Pass
145		11/10/15	03	ASTM D1557	A-4	14.0	116.0	15.2	113.5	8	98	95	-3/3	Pass
146		11/10/15	03	ASTM D1557	A-4	14_0	116.0	14.2	113.9	8	98	95	-3/3	Pass
147		11/10/15	03	ASTM D1557	A-4	14.0	116.0	14.4	113.3	8	98	95	-3/3	Pass
148		11/10/15	03	ASTM D1557	A-4	14.0	116.0	14.9	112.8	8	97	95	-3/3	Pass
149		11/10/15	01	ASTM D698	A-6	10_1	121.7	12.2	116.7	8	96	95	-1/3	Pass
150	ili	11/10/15	03	ASTM D1557	A-4	14.0	116.0	13.8	113.6	8	98	95	-3/3	Pass
						uu Enr	Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			Bauge Model / SN	Field Tech	nician
143	Utility Tro		: Water Service	West 68th	Place westboun	d, second se	rvice east of	2,0	BSG			k 3500 1937	Haidak, Jake	
144	Utility Tro		: Water Service	West 68th	Place, westboun	d, third servi	ce east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jal	(e
145	Utility Tre		: Water Service,	, West 68th	Place, westboun	d, fourth serv	vice east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jal	ке
146		ench Backfill	: Water Service,	, West 68th	Place, westboun	d, fifth servic	e east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jal	ke
147	Utility Trench Backfill: Water Service, West 68th Place, westbound, sixth service east of Juniper Court							2.0	BSG		InstroTe	k 3500 1937	Haidak, Jal	ке
148	Utility Trench Backfill: Water Service, West 68th Place, westbound, seventh service east of Juniper Court							2.0	BSG		InstroTe	k 3500 1937	Haidak, Jal	(e
149	Utility Trench Backfill: Water Service, West 68th Place, westbound, eighth service east of Juniper Court							2.0	BSG		InstroTe	k 3500 1937	Haidak, Jal	ке
								2.0	BSG		instroTe	k 3500 1937	Haidak, Jal	(e



Field Services

Denver CO 80222 Phone (303) 759-8100

2180 South Ivanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000023

Report Date: 12/15/2015 Test Method: ASTM D 6938 Client:

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Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project: 144725UF

Geos Neighborhood 69th and Joyce Street

Remarks	Comments		Related T	ests
Pass: Density Pass / Moisture Pass	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter".			
	Gauge calibration data on file with the testing agency	Test #	Related Test #	Test Type

### A.G. Wassenaar

Consulting Engineers Geotechnical, Environmental and Related Services

Field Services 2180 South Iyanhoe Street, Suite 5

Denver CO 80222 Phone (303) 759-8100

#### **Fill Testing**

Report #: FT-000023 Report Date: 12/15/2015

Test Method: ASTM D 6938

Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF

Geos Neighborhood 69th and Joyce Street

						10-911	Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
151		11/10/15	03	ASTM D1557	A-4	14.0	116.0	13.8	114.0	8	98	95	-3/3	Pass
152		11/10/15	03	ASTM D1557	A-4	14.0	116.0	14.4	113.5	8	98	95	-3/3	Pass
153		11/10/15	03	ASTM D1557	A-4	14.0	116.0	14.1	113.2	8	98	95	-3/3	Pass
154		11/10/15	03	ASTM D1557	A-4	14.0	116.0	15.5	112.7	8	97	95	-3/3	Pass
155		11/10/15	01	ASTM D698	A-6	10.1	121.7	12.2	118.5	8	97	95	-1/3	Pass
156		11/10/15	01	ASTM D698	A-6	10.1	121.7	11.7	117.4	8	96	95	-1/3	Pass
157		11/10/15	03	ASTM D1557	A-4	14.0	116.0	14.9	112.5	8	97	95	-3/3	Pass
							Test Info	rmation						
Test#	Test Lo	cation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
151	Utility Tr		: Water Service	, West 68th	Place, westboun	d, 10th servi	ce east of	2.0	BSG		InstroTek 3500 1937		Haidak, Jai	ке
152	Utility Tr		Water Service	, West 68th	Place, westboun	d, 11th servi	ce east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	(e
153	Utility Tr		Water Service	, West 68th	Place, westboun	d, 12th servi	ce east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	(e
154	Utility Trench Backfill; Water Service, West 68th Place, westbound, 13th service east of Juniper Court						ce east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	re
155	Utility Trench Backfill: Water Service, West 68th Place, westbound, 14th service east of Juniper Court						ce east of	2.0	0 BSG		InstroTe	k 3500 1937	Haidak, Jak	(e
	Utility Trench Backfill: Water Service, West 68th Place, westbound, 15th service east of Juniper Court							2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	(e
	<ul> <li>Utility Trench Backfill: Water Service, West 68th Place, westbound, 16th service east of Juniper Court</li> </ul>						ce east of	2.0	BSG		InstroTe	k 3500 1937	Haidak, Jak	(e



Field Services

Denver CO 80222 Phone (303) 759-8100

2180 South (vanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000023 Report Date: 12/15/2015

Test Method: ASTM D 6938

Client:
Cottonwood Park West, LLC

1240 Lehigh Street
Boulder, CO 80305

Project:

144725UF Geos Neighborhood 69th and Joyce Street

Remarks	Comments		Related Tes	its
Pass: Density Pass / Moisture Pass	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency	Test #	Related Test #	Test Type
	157: The Contractor utilized an excavator with a compactor wheel attachment to apply compactive effort to the utility trench backfill. Moisture was applied to the fill.			*1



Report #: FT-000024 Report Date: 3/17/2016 Test Method: ASTM D 6938 Client:
Cottonwood Park West, LLC
1240 Lehigh Street
Boulder, CO 80305

Project:
144725UF
Geos Neighborhood

Arvada, CO

69th and Joyce Street

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222

Denver CO 80222 Phone (303) 759-8100

							Test R	lesults		==1 =1 ,			and Lead III	
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	MaxImum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Molsture Tolerance (%)	Remark
158		2/25/16	01	ASTM D698	A-6	10.1	121.7	13.0	119.6	8	98	95	-1/3	Pass
159	59 2/25/16 01 ASTM A-6 10.1 D698							12.5	120 5	8	99	95	-1/3	Pass
	171						Test Info	ormation						
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Fleid Techi	nician
158	Alley: All	ey B, 25' we	st of Joyce Stre	et				0.0	TSG	ĺ	Troxler	3430 27056	Murphy, Joh	าก
159	Alley: All	ey B, 100' w	est of Joyce Str	eet				0.0	TSG		Troxler	3430 27056	Murphy, Joh	าก
		R	emarks					Comments				Relat	ed Tests	
Pass: [	Density Pa	ass / Moistur	e Pass				nsmission" (Meth- ta on file with the		obe depth is noted	as "Backscatter	Test #	Related Tes	t# Test	Туре
					159:	The Contract	or, E-Z, prepare	ed subgrade	prior to our arriva	al				



Field Services 2180 South Ivanhoe Street, Suite 5

Denver CO 80222 Phone (303) 759-8100

## **Fill Testing**

Report #: FT-000025 Report Date: 3/17/2016 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street

Boulder, CO 80305

Project:

144725UF

Geos Neighborhood 69th and Joyce Street

	1.4					2	Test R	lesults		3				
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Molsture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remari
160		2/26/16	01	ASTM D698	A-6	10.1	121.7	12.4	115.8	8	95	95	-1/3	Pass
161		2/26/16	01	ASTM D698	A-6	10.1	121.7	12.9	119.3	8	98	95	-1/3	Pass
162		2/26/16	01	ASTM D698	A-6	10.1	121.7	13.0	117.7	8	97	95	-1/3	Pass
	I II						Test Info	ormation						
Test #	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
160	Alley: All	ey B, 90' we	st of Joyce stree	et				0.0	TSG		Troxler	3430 23705	Bosserman	Sean
161	Alley: All	ey B, 150' w	est of Joyce str	eet				0.0	TSG		Troxler	3430 23705	Bosserman	Sean
162	162 Alley: Alley B, 125' west of Joyce street and 50' north							0.0	TSG		Troxler	3430 23705	Bosserman	Sean
	Remarks							Comments				Relat	ed Tests	
Pass: I	: Density Pass / Moisture Pass					e calibration da	ta on file with the	testing agency	obe depth is noted for to our arrival	l as "Backscatt	Test#	Related Tes	t# Test	Туре



Report #: FT-000026 Report Date: 3/17/2016 Test Method: ASTM D 6938

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Client:

Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

**Field Services** 2180 South Ivanhoe Street, Suite 5

Denver, CO 80222 Phone (303) 759-8100

	110						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	in Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
163		3/3/16	03	ASTM D1557	A-4	14.0	116.0	15.8	111.4	8	96	95	-3/3	Pass
164		3/3/16	03	ASTM D1557	A-4	14.0	116.0	13,4	114.5	8	99	95	-3/3	Pass
165		3/3/16	01	ASTM D698	A-6	10.1	121.7	11.2	117.6	8	97	95	-1/3	Pass
							Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			iauge Model / SN	Field Tech	nician
163	Street Su	bgrade: All	ey A, 20' south c	f West 69th	Place			0.0	TSG		Troxler :	3430 036306	Bentley, Jin	1
164	Street St	ibgrade: Alle	ey A, 150' south	of West 69	ih Place			0.0	TSG		Troxler 3	3430 036306	Bentley, Jin	n
165	Street Su	bgrade: All	ey A, 300' south	of West 69	ih Place			0.0	TSG		Troxler :	3430 036306	Bentley, Jin	n
	Remarks											Relate	ed Tests	
Pass: [									obe depth is noted	l as "Backscatte	Test #	Related Tes	t# Test	Туре
	Gauge calibration data on file with the testing agency  165: The Contractor, EZ Excavating, previously prepared the street subgr prior to our arrival. We observed the Contractor perform a proof roll. A sm amount of deflection was observed along the west edge of Alley A.										e			



Report #: FT-000027 Report Date: 3/17/2016 Test Method: ASTM D 6938 Cottonwood Park West, LLC 1240 Lehigh Street

Boulder, CO 80305

Client:

, 220

Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222

Denver CO 80222 Phone: (303) 759-8100

						3	Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soli Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Optimum Moisture Tolerance (%)	Remark
166		3/11/16	01	ASTM D698	A-6	10.1	121.7	9,9	120 9	8	99	95	-1/3	Pass
167	D698					121.7	9.9	121.6	8	100	95	-1/3	Pass	
168		3/11/16	01	ASTM D698	A-6	10.1	121.7	9.7	121.1	8	100	95	-1/3	Pass
	1.69						Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Fleld Tech	nician
166	Curb and	Gutter: We	st 68th Place, n	orth side, 7	5' east of Juniper	Court		0.0	TSG		Troxler	3430 036306	Bentley Jin	1
167	Curb and	Gutter: Jun	iper Court, east	side, 100' r	orth of West 68th	n Place		0.0	TSG		Troxler	3430 036306	Bentley, Jin	1
168	Curb and	Gutter: Jun	iper Court, wes	side, 100'	north of West 68t	h Place		0.0	TSG		Troxler	3430 036306	Bentley, Jin	1
		R	emarks				(	Comments				Relate	d Tests	
Pass: I	Density Pa	iss / Moistur	e Pass		Gauge	calibration dat The Contract	a on file with the	testing agency	obe depth is noted y prepared the s		Test #	Related Test	# Test	Туре

## A.G. Wassenaar Consulting Engineers Geolachnical, Environmental and Related Services

**Fill Testing** 

Report #: FT-000028 Report Date: 3/17/2016 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street Suite 5 Denver CO 80222 Phone (303) 759-8100

	8						Test R	esults						
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
169		3/14/16	01	ASTM D698	A-6	10.1	121.7	9.3	118,9	8	98	95	-1/3	Pass
170		3/14/16	01	ASTM D698	A-6	10.1	121,7	9.7	120 6	8	99	95	-1/3	Pass
17.1		3/14/16	01	ASTM D698	A-6	10.1	121.7	10,1	115.7	8	95	95	-1/3	Pass
172		3/14/16	03	ASTM D1557	A-4	14.0	116,0	15.9	111,3	8	96	95	-3/3	Pass
173		3/14/16	03	ASTM D1557	A-4	14.0	116.0	12,8	111,2	8	96	95	-3/3	Pass
174		3/14/16	03	ASTM D1557	A-4	14.0	116.0	13.2	113.6	8	98	95	-3/3	Pass
175		3/14/16	03	ASTM D1557	A-4	14.0	116,0	7.7	105.2	8	91	95	-3/3	Fail
176		3/14/16	01	ASTM D698	A-6	10_1	121,7	12.8	115.8	8	95	95	-1/3	Pass
							Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			auge Model / SN	Field Tech	nician
169	Curb and	f Gutter: So	uth side of West	68th Place	, 375' east of Jur	niper Court		0.0	TSG		Troxler :	3430 036306	Bentley, Jin	n
170	Curb and	Gutter: So	uth side of West	68th Place	, 125' east of Jur	niper Court		0.0	TSG		Troxler :	3430 036306	Bentley, Jin	n
	1				25' east of Juni			0.0	TSG		Troxler	3430 036306	Bentley, Jin	n
172	Curb and	Gutter: No	rth side of West	68th Place	325' east of Jun	iper Court	7 0 11	0.0	TSG		Troxler :	3430 036306	Bentley, Jin	n
173	Curb and	Gutter No	rth side of West	68th Place	75' east of Juni	per Court		0.0	TSG		Troxler	3430 036306	Bentley, Jin	n
174	Curb and	Gutter: Eas	st side of Junipe	r Court, 10'	north of West 68	8th Place		0.0	TSG		Troxler :	3430 036306	Bentley, Jin	n
175	75 Curb and Gutter: East side of Juniper Court, 10' north of West 68th Place								TSG		Troxler :	3430 036306	Bentley, Jin	n
176	Curb and	Gutter; Eas	st side of Junipe	r Court, 400	o' north of West	88th Place		0.0	TSG		Troxler :	3430 036306	Bentley, Jin	n
		Remarks										Relate	d Tests	
	B 435	ensity Pass / Moisture Pass					nsmission" (Metho ta on file with the		obe depth is noted	as "Backscatte	Test #	Related Test	# Test	Туре



Report #: FT-000028 Report Date: 3/17/2016 Test Method: ASTM D 6938 Client:
Cottonwood Park West, LLC
1240 Lehigh Street

Boulder, CO 80305

Project:

144725UF
Geos Neighborhood
69th and Joyce Street
Arvada, CO

Field Services 2180 South Ivanhoe Street Suite 5 Denver CO 80222 Phone (303) 759-8100

					The contract		Test R	esults					117	
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
177		3/14/16	01	ASTM D698	A-6	10.1	121.7	9.7	117.7	8	97	95	-1/3	Pass
178	78 3/14/16 01 ASTM A-6 10.1 D698							10.2	117.0	8	96	95	-1/3	Pass
							Test Info	ormation						
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
177	Curb and	Gutter: We	st side of Junipe	er Court, 75	north of West 68	3th Place		0.0	TSG		Troxler	3430 036306	Bentley, Jin	n
178	Curb and	Gutter: We	st side of Junipe	er Court, 32	5' north of West 6	8th Place		0.0	TSG		Troxler	3430 036306	Bentley, Jin	n
		R	emarks					Comments				Relate	ed Tests	
Pass: Density Pass / Moisture Pass  Tests are "Direct Transmission Gauge calibration data on file v										as "Backscatte	Test #	Related Tes	t# Test	Туре
					our ar	тival. Test 17		loose fill. The	y prepared the s contractor was		to			

Field Services 2180 South Ivanhoe Street, Suite 5 Denver CO 80222 Phone: (303) 759-8100

## **Fill Testing**

Report #: FT-000029 Report Date: 6/7/2016 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

	6 JUE 1						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
179		6/3/16	02	ASTM D698	A-6	15.8	109.1	16.8	106.3	8	97	95	-1/3	Pass
180		6/3/16	03	ASTM D1557	A-4	14.0	116.0	15.0	114.0	8	98	95	-3/3	Pass
181		6/3/16	03	ASTM D1557	A-4	14.0	116.0	15.4	112.5	8	97	95	-3/3	Pass
182		6/3/16	03	ASTM D1557	A-4	14.0	116.0	15.0	112.9	8	97	95	-3/3	Pass
183		6/3/16	03	ASTM D1557	A-4	14.0	116.0	14.6	112.6	8	97	95	-3/3	Pass
184		6/3/16	03	ASTM D1557	A-4	14.0	116.0	16.8	112.8	8	97	95	-3/3	Pass
185		6/3/16	02	ASTM D698	A-6	15.8	109.1	15.8	108.1	8	99	95	-1/3	Pass
186		6/3/16	03	ASTM D1557	A-4	14.0	116.0	14.9	111.9	8	96	95	-3/3	Pass
	1 4						Test Info	rmation						
Test #	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Tech	nician
179	Curb and	Gutter: Soi	uth side of west	68th Place,	90' west of Joyce	Street		0.0	TSG		Troxler	3430 22403	Duggan, Da	aniel
180					, 200' west of Joy			0.0	TSG		Troxler	3430 22403	Duggan, Da	aniel
181					120' west of Joy			0.0	TSG		Troxler	3430 22403	Duggan, Da	aniel
182	Curb and	l Gutter: No	rth side of West	68th Place,	280' west of Joy	ce Street		0.0	TSG		Troxler	3430 22403	Duggan, Da	aniel
183	Curb and	i Gutter, We	st side of Junipe	r Street, 50	)' north of 68th Pla	ace		0.0	TSG		Troxler	3430 22403	Duggan, Da	aniel
184	184 Curb and Gutter: West side of Juniper street, 160' north of 68th place							0.0	TSG		Troxler	3430 22403	Duggan, Da	aniel
185	Curb and	Gutter: Eas	st side of Junipe	r Street, 10	0' north of 68th P	lace		0.0	TSG		Troxler	3430 22403	Duggan, Da	aniel
186	Curb and	Gutter: Eas	st side of Junipe	r Street, 20	0' north of 68th P	lace		0.0	TSG		Troxler	3430 22403	Duggan, Da	aniel
	Remarks							Comments				Relate	d Tests	
Pass: (	Density Pa	ass / Moistu	re Pass		Gauge	calibration da	a on file with the	testing agency	obe depth is noted red prior to my a		Test#	Related Test	# Test	Туре

# A.G. Wassenaar Consulting Engineers Geotechnical, Environmental and Related Services

**Fill Testing** 

Report #: FT-000030 Report Date: 6/30/2016 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South (vanhoe Street, Suite 5 Denver, CO 80222 Phone: (303) 759-8100

	£ []						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
187		6/6/16	03	ASTM D1557	A-4	14.0	116.0	9.6	108.4	8	93	95	-1/3	Fail
188		6/6/16	03	ASTM D1557	A-4	14,0	116.0	12.3	112.4	8	97	95	-1/3	Fail
189		6/6/16	03	ASTM D1557	A-4	14.0	116.0	11.8	111.9	8	96	95	-1/3	Fail
190		6/6/16	03	ASTM D1557	A-4	14.0	116.0	12.5	115.0	8	99	95	-1/3	Fail
191	D698							10.5	119.7	8	98	95	-1/3	Pass
192		6/6/16	01	ASTM D698	A-6	10.1	121.7	11.9	120.5	8	99	95	-1/3	Pass
							Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			auge Model / SN	Field Tech	nician
187	Curbiano	Gutter: So	uth side of 68th	Place, 140'	west of Joyce St	reet		0.0	TSG		Troxler	3430 22403	Duggan, Da	iniel
188					orth of 68th Pl			0.0	TSG		Troxler	3430 22403	Duggan, Da	anie!
189			'		10' north of 68th F			0.0	TSG		Troxler	3430 22403	Duggan, Da	aniel
					west of Joyce Str			0.0	TSG			3430 22403	Duggan, Da	aniel
					west of Joyce S			0.0	TSG		Troxler	3430 22403	Duggan, Da	niel
192	192 Street Subgrade: Northbound lane on 68th, 210' west of Joyce Street							0,0	TSG		Troxler	3430 22403	Duggan, Da	aniel
		R	lemarks					Comments			A Linear Contract	Relate	d Tests	
Fail: De	II: Density Fail / Moisture Fail Tests are "Direct Transmissio Gauge calibration data on file									l as "Backscatter	Test #	Related Test	# Test	Туре
	Density Pass / Moisture Fail  Density Pass / Moisture Pass						or utilized a grade was applied to		ompactive effor le.	t to the		•		

A.G. Wassenaar

Consulting Engineers Geotechnical, Environmental and Related Services

Fleid Services 2180 South Ivanhoe Street, Suite 5

2180 South Ivanhoe Street, Suite Deriver, CO 80222 Phone: (303) 759-8100

### **Fill Testing**

Report #: FT-000031 Report Date: 6/30/2016 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF

Geos Neighborhood 69th and Joyce Street

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soll Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
193	190	6/7/16	03	ASTM D1557	A-4	14.0	116.0	14.6	114.9	8	99	95	-1/3	Pass
194	187	6/7/16	03	ASTM D1557	A-4	14.0	116.0	15.4	114,5	8	99	95	-1/3	Pass
195		6/7/16	03	ASTM D1557	A-4	14.0	116.0	13,1	114.9	8	99	95	-1/3	Pass
196		6/7/16	03	ASTM D1557	A-4	14.0	116.0	13,1	110.5	8	95	95	-1/3	Pass
197		6/7/16	03	ASTM D1557	A-4	14.0	116.0	13,2	113,7	8	98	95	-3/3	Pass
	ĮЩ						Test Info	rmation				1		
Test#	Test Loc	ation					-	Elevation	Reference			Sauge Model / SN	Field Techi	nician
193	Street Su	ibgrade: No	rthbound lane or	n 68th, 80' v	vest of Joyce Stre	eet		0,0	TSG	i	Troxler	3430 22403	Duggan, Da	nieľ
194	Curb and	Gutter: So	uth side of 68th f	Place, 140'	west of Joyce Str	eet		0.0	TSG		Troxler	3430 22403	Duggan, Da	niel
195	Curb and	Gutter: So	uth side of 68th f	Place, 30' w	est of Joyce Stre	et		0.0	TSG		Troxler	3430 22403	Duggan, Da	
196	Curb and	Gutter: So	uth side of 68th f	Place, 80' w	est of Joyce Stre	et		0.0	TSG		Troxler	3430 22403	Duggan, Da	
197	Street Su	bgrade: So	uthbound lane o	f 68th Place	, 200' west of Jo	yce Street		0,0	TSG	i	Troxler	3430 22403	Duggan, Da	niel
		R	emarks					Comments				Relate	d Tests	
Pass: [	: Density Pass / Moisture Pass Tests are "Direct Tr Gauge calibration d							od A) unless pr testing agency	obe depth is noted	as "Backscatter	Test #	Related Test	# Test	Туре

## A.G. Wassenaar

Consulting Engineers
Geotechnical, Environmental
and Related Services

Field Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222

### **Fill Testing**

Report #: FT-000032 Report Date: 6/30/2016 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Phone: (303) 759-8100 **Test Results** Optimum Maximum In Place In Place Probe Optimum Retest Test Soll Moisture Min Comp. **Dry Density** Moisture **Dry Density** Percent Depth Moisture Method Classification Test # Of Date Proctor ID (%) (pcf) (%) (pcf) (in) Compaction (%) Tolerance (%) Remark 6/8/16 198 188 03 **ASTM** A-4 14.0 116.0 15.3 112.5 8 97 95 -1/3 Pass D1557 189 03 **ASTM** 199 6/8/16 A-4 14.0 116.0 14.4 8 99 114.6 95 -1/3Pass D1557 200 6/8/16 03 **ASTM** 14:0 A-4 116.0 15.4 8 115.3 99 95 -1/3Pass D1557 03 201 6/8/16 **ASTM** A-4 14.0 116.0 14.5 114.8 8 99 95 -1/3Pass D1557 202 6/8/16 01 **ASTM** A-6 10.1 121.7 12.9 118.7 8 98 95 -1/3 **Pass** D698 203 6/8/16 01 **ASTM** A-6 10:1 121.7 11.8 120.6 8 99 95 -1/3 Pass D698 204 6/8/16 01 **ASTM** A-6 10.1 121.7 12.4 119.3 8 98 95 -1/3 **Pass** D698 **Test Information** Gauge Test # **Test Location** Elevation Reference Make / Model / SN Field Technician 198 Curb and Gutter West side of Juniper Street, 40' north of 68th Place 0.0 TSG Troxler 3430 22403 Duggan, Daniel Curb and Gutter West side of Jumper Street, 130' north of 68th Place 199 0.0 TSG Troxler 3430 22403 Duggan, Daniel 200 Curb and Gutter East side of Juniper Street, 40' north of 68th Place 0.0 TSG Troxler 3430 22403 Duggan, Daniel 201 Curb and Gutter: East side of Juniper Street, 150' north of 68th Place TSG 0.0 Troxler 3430 22403 Duggan, Daniel 202 Street Subgrade: East lane on Juniper Street, 10' north of 68th Place 0.0 TSG Troxler 3430 22403 Duggan, Daniel 203 Street Subgrade: East lane on Juniper Street, 180' north of 68th Place TSG 0.0 Troxler 3430 22403 Duggan, Daniel Street Subgrade: West lane on Juniper Street, 130' north of 68th Place 204 TSG 0.0 Troxler 3430 22403 Duggan, Daniel Remarks Comments **Related Tests** Pass: Density Pass / Moisture Pass Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter" Gauge calibration data on file with the testing agency Test# Related Test # **Test Type** 204: The Contractor utilized a roller to apply compactive effort to the

subgrade. Moisture was applied to the street subgrade.



Report #: FT-000033 Report Date: 6/30/2016 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

FIEIG Services
2160 South Ivanhoe Street Suite 5
Denver CO 80222
Phone. (303) 759-8100

	I II		100	_			Test R	esults				1		
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
205		6/14/16	02	ASTM D698	A-6	15.8	109.1	14.9	106.8	8	98	95	-1/3	Pass
206		6/14/16	02	ASTM D698	A-6	15.8	109,1	15.6	105.3	8	97	95	-1/3	Pass
207								15.2	114.8	8	99	95	-3/3	Pass
	1 1 1 1 1 1						Test Info	ormation						
Test #	Test Loc	ation						Elevation	Reference			Gauge Model / SN	Field Techi	nician
205	Curb and	Gutter: Sou	ith side of 68th	Place, 90' w	est of Jayce Stre	et.		0.0	TSG		Troxler	3430 22403	Duggan, Da	niel
206	Curb and	Gutter Eas	st side of Junipe	r Street, 10	north of 68th Pla	ice.		0.0	TSG		Troxler	3430 22403	Duggan, Da	niel
207	Crosspa	n. North side	of Joyce Stree	t at the inter	section of Joyce	Street and 68	3th Place	0.0	TSG		Troxler	3430 22403	Duggan, Da	niel
		R	emarks		E I			Comments			100	Relate	d Tests	
Pass: i	ass: Density Pass / Moisture Pass Tests are "Direct Transmissing Gauge calibration data on file									l as "Backscatter	Test#	Related Test	# Test	Туре
	206: The Contractor utilized a loader to apply compactive effort to t subgrade. Moisture was applied to the subgrade.										k	-		



Field Services

Denver CO 80222 Phone: (303) 759-8100

2180 South tvanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000034 Report Date: 8/15/2016

Test Method: ASTM D 6938

Client:

Cottonwood Park West, LLC 1240 Lehigh Street

Boulder, CO 80305

Project:

144725UF

Geos Neighborhood 69th and Joyce Street

	0.78						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Molsture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
208	175	6/30/16	03	ASTM D1557	A-4	14.0	116.0	13.9	113.9	8	98	95	-3/3	Pass
209		6/30/16	01	ASTM D698	A-6	10.1	121.7	9.9	119.5	8	98	95	-1/3	Pass
210		6/30/16	01	ASTM D698	A-6	10.1	121.7	9.2	118.9	8	98	95	-1/3	Pass
				0,51			Test Info	rmation		1 72				
Test #	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Techr	nician
208	Curb and	Gutter: Eas	st side of Junipe	r Court, 10'	north of West 68	lh Place		0.0	TSG		Trox	er 3430 +	Frase, Jerei	miah
209	Crosspa	n. Center of	crosspan at 68t	h Place and	Joyce Street			0.0	TSG		Trox	er 3430 +	Frase, Jerei	
210	210 Crosspan. Center of crosspan at 69th Avenue and Juniper Court							0,0	TSG			er 3430 +	Frase, Jerei	
	II	Rema	arks				Comments							
Pass:	lass: Density Pass / Moisture Pass Tests are "Direct Transmission" (Method A) un "Backscatter" Gauge calibration data on file v						(Method A) unle	ss probe depth the testing age	is noted as					
	210: The Contractor, CCC, had prepare arrival.													



**Field Services** 

Denver CO 80222 Phone: (303) 759-8100

2180 South Ivanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000035 Report Date: 8/15/2016

Test Method: ASTM D 6938

Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF

Geos Neighborhood 69th and Joyce Street

Arvada, CO

	1.0						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
211		7/5/16	01	ASTM D698	A-6	10.1	121,7	9.5	118.6	В	97	95	-1/3	Pass
							Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			Sauge Model / SN	Field Techi	nician
211	Crosspar	n. Center of	crosspan at 69t	h Avenue a	nd Juniper Court			0,0	TSG		Troxler	3430 32100	Frase, Jere	miah
		Rem	arks				Comments							
Pass: [	Density Pa	ıss / Moistu	re Pass		Tests are "Direct "Backscatter" G	Transmission' auge calibratio	(Method A) unle n data on file with	ss probe depth the testing ag	is noted as ency					

211: The Contractor had prepared the subgrade prior to our arrival.



Report #: FT-000036 Report Date: 7/3/2017 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

Fleid Services 2180 South Ivanhoe Street Suite 5 Denver, CO 80222 Phone. (303) 759-8100

							Test R	esults				-11-2-1		
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
212		10/20/16	01	ASTM D698	A-6	10.1	121.7	11.3	119,3	8	98	95	-1/3	Pass
213		10/20/16	01	ASTM D698	A-6	10.1	121.7	10.9	118.4	8	97	95	-1/3	Pass
214		10/20/16	01	ASTM D698	A-6	10.1	121,7	11.0	116.7	8	96	95	-1/3	Pass
			4		-	Was e	Test Info	rmation						100
	Test Lo							Elevation	Reference			auge Model / SN	Field Tech	nician
					f West 68th Stree			0.0	TSG		Troxler 3430 33202		Plack, Ron	
								0.0	TSG		Troxler 3430 33202		Plack, Ron	
214 Curb and Gutter: 20' north of West 68th Street, west side of Juniper Street								0.0	TSG		Troxler	3430 33202	Plack, Ron	
	1 16	Rema	ırks				Comments							
Pass: (	Density Pa	ass / Moistur	e Pass		Tests are "Direct	Transmission"	(Method A) unter	s probe depth	is noted as					

Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.

for density testing prior to our arrival.

214: The Contractor prepared sidewalk and curb and gutter subgrade



Report #: FT-000037 Report Date: 7/3/2017 Test Method: ASTM D 6938

prior to our arrival.

Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

Arvada, CO

Fleld Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone: (303) 759-8100

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soll Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
215		10/28/16	03	ASTM D1557	A-4	14.0	116.0	9.3	114.5	8	99	95	-3/3	Fail
216		10/28/16	03	ASTM D1557	A-4	14.0	116.0	9.0	114,1	8	98	95	-3/3	Fail
	1 1						Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			iauge Model / SN	Field Tech	nician
_					bound lane of We		-	0.0	TSG		Troxler	3430 33202	Plack, Ron	
216 Street Subgrade: 150' east of Juniper Street, eastbound lane of West 68th Place							ce	0.0	TSG		Troxler	3430 33202	Plack, Ron	
	I AR	Rema	rks		عبير بعطالة		Comments							
Fall: D	all: Density Pass / Moisture Fail				Tests are "Direct Transmission" (Method A) unless probe depth is r "Backscatter". Gauge calibration data on file with the testing agency									
216: The Contractor prepared the stree							ed the street su	ibgrade for de	ensity testing					



Report #: FT-000038

Report Date: 7/3/2017 Test Method: ASTM D 6938 Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Client:

Project:

144725UF

Geos Neighborhood 69th and Joyce Street

Field Services
2180 South Ivanhoe Street, Suite 5
Denver CO 80222
Phone: (303) 759-8100

	1.11						Test R	esuits						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
217		10/31/16	03	ASTM D1557	A-4	14.0	116.0	9.4	113.9	8	98	95	-3/3	Fail
218		10/31/16	03	ASTM D1557	A-4	14.0	116.0	9.7	114,5	8	99	95	-3/3	Fail
219	217	10/31/16	03	ASTM D1557	A-4	14.0	116.0	11.3	111.7	8	96	95	-3/3	Pass.
220	218	10/31/16	03	ASTM D1557	A-4	14.0	116.0	11.0	112,4	8	97	95	-3/3	Pass
	1119						Test Info	rmation						
Test #	# Test Location							Elevation	Reference			Sauge Model / SN	Field Tech	nician
217	Sidewalk: 180' east of Juniper Street, north side of West 68th Place							0.0	TSG		Troxler	3430 33202	Plack, Ron	
	The state of the s							0.0	TSG		Troxler	3430 33202	Plack, Ron	
	Sidewalk: 180' east of Juniper Street, north side of West 68th Place							0.0	TSG		Troxler 3430 33202		Plack, Ron	
220	20 Sidewalk: 40' east of Juniper Street, north side of West 68th Place							0,0	TSG		Troxler 3430 33202			

Remarks	Comments
Fail: Density Pass / Moisture Fail	Tests are "Direct Transmission" (Method A) unless probe depth is noted as  "Backscatter". Gauge calibration data on file with the testing agency
Pass: Density Pass / Moisture Pass	220: The Contractor prepared the sidewalk subgrade for density testing prior to our arrival.



Field Services

Denver CO 80222 Phone (303) 759-8100

2180 South (vanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000039 Report Date: 7/3/2017

Test Method: ASTM D 6938

Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street

							Test R	esults						
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
221		11/1/16	01	ASTM D698	A-6	10.1	121.7	11.4	117.3	8	96	95	-1/3	Pass
222	215	11/1/16	03	ASTM D1557	A-4	14.0	116.0	12.7	114.4	8	99	95	-3/3	Pass
223	216	11/1/16	03	ASTM D1557	A-4	14.0	116.0	13:1	113.3	8	98	95	-3/3	Pass
224		11/1/16	01	ASTM D698	A-6	10.1	121,7	9.6	119.3	8	98	95	-1/3	Pass
							Test Info	rmation						
	Test Loc							Elevation	Reference		Gauge Make / Model / SN		Field Techi	nician
								0.0	TSG		Troxler 3430 33202		Plack, Ron	
222	Street Subgrade 50' east of Juniper Street, eastbound lane of West 68th Place						е	0.0	TSG	Troxler 3430 33202		Plack, Ron		
223	3 Street Subgrade: 150' east of Juniper Street, eastbound lane of West 68th Place						ce	0.0	0.0 TSG		Troxler 3430 33202		Plack, Ron	
224	24 Street Subgrade: 80' north of West 68th Place, northbound lane of Juniper Street							0.0	TSG		Troxler	3430 33202	Plack, Ron	

Remarks	Comments
Pass: Density Pass / Moisture Pass	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.
	224: The Contractor prepared the crosspan subgrade for density testing prior to our arrival. The Contractor had reworked the failing street subgrade and prepared more subgrade for density testing prior to our arrival.



Report #: FT-000040 Report Date: 7/3/2017

Test Method: ASTM D 6938

Client:

\_\_\_\_

Cottonwood Park West, LLC 1240 Lehigh Street

Boulder, CO 80305

Geos Neighborhood 69th and Joyce Street

Arvada, CO

Project:

144725UF

Field Services 2180 South Ivanhoe Street, Suite 5 Deriver, CO 80222 Phone: (303) 759-8100

	i di						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
225		11/3/16	01	ASTM D698	A-6	10.1	121.7	9_1	115.4	8	95	95	-1/3	Pass
	8 1						Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			lauge Model / SN	Field Techi	nician
225	Crosspai	n: South side	e, intersection o	f West 68th	Place and Junipe	er Court		0.0	TSG		Troxler	3430 36855	Granato, Mi	
		Rema	arks				Comments							
Pass: [	Density Pa	ass / Moistui	re Pass		Tests are "Direct "Backscatter" Ga	Transmission* auge calibration	(Method A) unle n data on file with	ss probe depth the testing ag	is noted as ency.					
	1.19				225: The Contractor prepared the subgrade prior to our arrival									



Pass: Density Pass / Moisture Pass

**Fill Testing** 

Report #: FT-000041 Report Date: 7/3/2017 Test Method: ASTM D 6938 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South (vanhoe Street, Suite 5 Denver CO 80222 Phone: (303) 759-8100

	0 11						Test R	lesuits						
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Molsture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	in Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
226		11/10/16	01	ASTM D698	A-6	10.1	121,7	10.9	119 0	8	98	95	-1/3	Pass
227		11/10/16	01	ASTM D698	A-6	10.1	121.7	10,9	118.9	8	98	95	-1/3	Pass
228		11/10/16	01	ASTM D698	A-6	10.1	121.7	10.2	117.6	8	97	95	-1/3	Pass
229		11/10/16	01	ASTM D698	A-6	10.1	121.7	10.5	118.2	8	97	95	-1/3	Pass
230		11/10/16	01	ASTM D698	A-6	10.1	121.7	11.2	117,8	8	97	95	-1/3	Pass
231		11/10/16	01	ASTM D698	A-6	10.1	121.7	11.0	116.1	8	95	95	-1/3	Pass
232		11/10/16	01	ASTM D698	A-6	10,1	121.7	9.9	117.8	8	97	95	-1/3	Pass
233		11/10/16	01	ASTM D698	A-6	10,1	121.7	10.0	119.3	8	98	95	-1/3	Pass
	1,12						Test Info	rmation					The same all	
	Test Loc							Elevation	Reference			auge Model / SN	Field Techi	nician
					st of Joyce Street			0.0	TSG		Troxler	3430 36855	Granato, Mi	chael
					t of Juniper Cour			0.0	TSG		Troxler	3430 36855	Granato, Mi	chael
					of West 68th Plac			0.0	TSG		Troxler	3430 36855	Granato, Mi	chael
229							0.0	TSG		Troxler	3430 36855	Granato, Mi	chael	
						0.0	TSG		Troxler	3430 36855	Granato, Mi	chael		
	Street Subgrade: Juniper Court, northbound, 375' north of West 68th Place						0,0			Troxler 3430 36855		Granato, Mi	chael	
					D' north of West 6			0,0	TSG		Troxler	3430 36855	Granato, Mi	chael
233	Street Su	ibgrade: Jun	iper Court, soul	hbound, 50	D' north of West 6	8th Place		0.0	TSG		Troxler	3430 36855	Granato, Mi	chael

Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency

A.G. Wassenaar

Consulting Engineers

Geolechnical, Environmental
and Related Services

**Fill Testing** 

Report #: FT-000041 Report Date: 7/3/2017 Test Method: ASTM D 6938

1240 Lehigh Street Boulder, CO 80305

Cottonwood Park West, LLC

Client:

Project:

144725UF

Geos Neighborhood 69th and Joyce Street

Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone: (303) 759-8100

	2 1						Test R	esults		384				
Test#	Retest Of	Test Date	Proctor ID	Method	Soll Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
234		11/10/16	01	ASTM D698	A-6	10,1	121.7	12,1	116.8	8	96	95	-1/3	Pass
235		11/10/16	01	ASTM D698	A-6	10.1	121.7	11.8	117.2	8	96	95	-1/3	Pass
236		11/10/16	01	ASTM D698	A-6	10,1	121,7	9.9	117.3	8	96	95	-1/3	Pass
237		11/10/16	01	ASTM D698	A-6	10.1	121.7	11,1	118.5	8	97	95	-1/3	Pass
	湯は能と						Test Info	rmation				T W W		

	l'est information								
Test #	Test Location	Elevation	Reference	Gauge Make / Model / SN	Field Technician				
234	Street Subgrade: West 68th Place, eastbound, 125' east of Juniper Court	0.0	TSG	Troxler 3430 36855	Granato, Michael				
	Street Subgrade: West 68th Place, eastbound, 375' east of Juniper Court	0.0	TSG	Troxler 3430 36855	Granato, Michael				
236	Street Subgrade: West 68th Place, westbound, 250' east of Juniper Court	0,0	TSG	Troxler 3430 36855	Granato, Michael				
237	Street Subgrade: West 68th Place, westbound, 500' east of Juniper Court	0,0	TSG	Troxler 3430 36855	Granato, Michael				

Remarks	Comments
Pass: Density Pass / Moisture Pass	Tests are "Direct Transmission" (Method A) unless probe depth is noted as  "Backscatter". Gauge calibration data on file with the testing agency.
	237: The Contractor prepared the subgrade prior to our arrival.



Field Services

Denver CO 80222 Phone (303) 759-8100

2160 South Ivanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000042 Report Date: 7/3/2017

Test Method: ASTM D 6938

Citionwood Park West, LLC

1240 Lehigh Street Boulder, CO 80305 Project:

144725UF

Geos Neighborhood 69th and Joyce Street

							Test R	esults						
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Tolerance (%)	Remark
238		11/14/16	02	ASTM D698	A-6	15.8	109.1	15.3	106.1	8	97	95	-1/3	Pass
	Ř 13						Test Info	rmation						
Test#	Test Loc	ation						Elevation	Reference			iauge Model / SN	Field Techi	nician
238	Sidewalk: Northbound, Juniper Court, 120' south of West 69th Place							0.0	TSG	_	Troxler	3430 21919	Knauff, Ster	
		Rema	arks				Comments							
Pass: I	Density Pa	ass / Moistur	re Pass		Tests are "Direct "Backscatter" Ga	Transmission'	' (Method A) unle n data on file with	ss probe depth the testing age	is noted as					
	1.00				238: The Conti	actor prepar	ed the subgrad	e prior to our	arrival					



Field Services

Denver CO 80222 Phone (303) 759-8100

2180 South Ivanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000043
Report Date: 7/3/2017

Test Method: ASTM D 6938

Client:

Cottonwood Park West, LLC 1240 Lehigh Street

Boulder, CO 80305

Project:

144725UF

Geos Neighborhood 69th and Joyce Street

	1						Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Molsture Tolerance (%)	Remarl
239		11/16/16	03	ASTM D1557	A-4	14.0	116,0	12.8	113.5	8	98	95	-3/3	Pass
240		11/16/16	02	ASTM D698	A-6	15.8	109.1	15.8	103,4	8	95	95	-1/3	Pass
241		11/16/16	01	ASTM D698	A-6	10.1	121.7	10.5	119.4	8	98	95	-1/3	Pass
	N. III						Test Info	rmation						
Test#	Test Loc	cation					_	Elevation	Reference			auge Model / SN	Field Techi	nician
239	Sidewalk	c: Eastbound	Juniper Court,	5' east of E	ast 69th Avenue	_		0.0	TSG		Troxler	3430 21919	Knauff, Ster	hen
240	Sidewalk	c. Northbound	d. East 69th Ave	enue, 15' ea	st of Juniper Cou	urt		0.0	TSG		Troxler	3430 21919	Knauff, Ster	
241	241 Sidewalk: Eastbound, West 69th Place, 60' east of Juniper Court							0.0	TSG		Troxler	3430 21919	Knauff, Ster	
		Rema	ırks		T quantities		Comments							
Pass: [	Density Pa	ass / Moistur	e Pass				' (Method A) unle: n data on file with							
					241: The Conti	ractor prepar	ed the subgrad	e prior to our	arrival					



Fleid Services

Denver, CO 80222 Phone (303) 759-8100

2180 South Ivanhoe Street, Suite 5

**Fill Testing** 

Report #: FT-000044 Report Date: 7/3/2017

Test Method: ASTM D 6938

Client:

•

Cottonwood Park West, LLC

1240 Lehigh Street Boulder, CO 80305 144725UF

Project:

Geos Neighborhood 69th and Joyce Street

							Test R	esults						
Test#	Retest Of	Test Date	Proctor ID	Method	Soll Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp.	Optimum Moisture Toierance (%)	Remark
242		6/28/17	02	ASTM D698	A-6	15.8	109.1	16,0	104.2	8	96	95	-1/3	Pass
	0.10						Test Info	rmation						
	Test Loc							Elevation	Reference			auge Model / SN	Field Tech	nician
242	Water Ma	ain: Southbo	ound Juniper Co	urt, 225' soı	ith of West 96th F	Place		1.0	BSG		Troxler 3430 21919 Knauff, St			hen
	Remarks Comme								- 1					
Pass: (	Density Pa	ass / Moistu	re Pass		Tests are "Direct "Backscatter". Ga	Transmission'	' (Method A) unle: n data on file with	ss probe depth the testing age	is noted as					
					242: The Contr	ractor prepar	ed the subgrad	e around the	water valve					

## **SECTION 2**

Test Method: ASTM C 39

Report #: CC-000004 Report Date: 7/8/2016

Sample: 3636

Field Services

2180 South Ivanhoe Street, Suite 5

Denver, CO 80222 Phone: (303) 759-8100 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project:

144725UF

Geos Neighborhood 69th and Joyce Street

Arvada, CO

Sample Details

Set #: Specimen Size:

4" X 8"

Technician: Cast By:

Duggan, Daniel Duggan, Daniel **Batched:** Sampled:

12:12 MDT 13:20 MDT 13:35 MDT

Specimens In Set: Truck / Ticket #:

Contractor:

1608 / 46026739

**Date Cast:** Sampled From: 06/08/16 Chute

Cast: Truck Empty:

Colorado Concrete Construction

Placement Method:

Chute

Location

**Placement Time:** 

Placement Location:

**Curb and Gutter** 

**Location Details:** 

North side of 68th Place, 25' east of Juniper Street

Sample Location / Notes: NTP

**Batch Log** 

**Specifications** 

Supplier: On-Site Admixtures: None

Martin Marietta Materials Mix Design:

A4461

Strength: Air:

4500 (psi) 5.0 - 8.0 (%)

Slump:

1 - 4 (in)

Field Measurements

Weather: Sunny Air Temperature (F): 83

Slump (in): Concrete Temp (F): 2-1/2 (ASTM C143) 82 (ASTM C1064)

Air Content:

Plastic Unit Weight: 144.1 (lb/ft³) (ASTM C138)

Load Volume:

5.9 (%) (ASTM C231) 10 (yd³)

**Standard Cure** 

Min / Max Temp (F): **Initial Cure Method:**  52/84 Cooler, closed lid

**Final Cure Method:** 

ASTM C511

**Field Cure** 

	Lab Test Results									
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (In)	Cylinder Area (in²)	Max Load (lbs)	Strength (psl)	Fracture Type	Break Remark	Capping Method
1-1	7	06/15/16	1/6	4.00	12.57	40,655	3,230	5		N
1-2	28	07/06/16	1 / 27	4.00	12.57	61,160	4,870	4		N
1-3	28	07/06/16	1/27	4.00	12.57	63,905	5,080	1		N
1-4	28	07/06/16	1/27	4.00	12.57	60,945	4,850	4		N
1-5	56	08/03/16	1 / 55							

Test Age Average Strengths (psi): 7 Day - 3230, 28 Day - 4930

**Break Remarks** 

Capping Methods N: Unbonded Caps (ASTM C1231)

**General Remarks** 

Delivered 10 of 80.1 cubic yards









## A.G. Wassenaar Consulting Engineers Geotechnical, Environmental and Related Services

## **Compressive Strength of Concrete**

Test Method: ASTM C 39

Report #: CC-000005 Report Date: 7/8/2016 Sample: 3644

**Field Services** 

2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone (303) 759-8100 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Sample Details Set #: 2 Techniclan: Duggan, Daniel Batched: 15 54 MDT Specimen Size: 4" X 8" Cast By: Duggan, Daniel Sampled: 17.05 MDT Specimens In Set: **Date Cast:** 06/08/16 Cast: 17 20 MDT Truck / Ticket #: 1627 / 45049055 Sampled From: Chute Truck Empty: Contractor: Colorado Concrete **Placement Method:** Chute **Placement Time:** Construction Location **Placement Location: Curb and Gutter Location Details:** East side of Juniper Street, 80' north of 68th Place Sample Location / Notes: **Batch Log Specifications** Martin Marietta Materials Mix Design: A4461 Supplier: Strength: 4500 (psi) On-Site Admixtures: None 5.0 -8.0 (%) Air: Slump: 1 - 4 (in) **Field Measurements** Weather: Cloudy Slump (in): 3 (ASTM C143) Plastic Unit Weight: 143 7 (lb/ft3) (ASTM C138) Air Temperature (F): 81 88 (ASTM C1064) 5.0 (%) (ASTM C231) Concrete Temp (F): Air Content: **Load Volume:** 10 (yd³) **Standard Cure** Field Cure

	Lab Test Results									
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (lbs)	Strength (psl)	Fracture Type	Break Remark	Capping Method
2-1	7	06/15/16	1/6	4,00	12.57	49,790	3,960	3		N
2-2	28	07/06/16	1 / 27	4,00	12.57	77,320	6,150	4		N
2-3	28	07/06/16	1 / 27	4.00	12.57	78,840	6,270	4		N
2-4	28	07/06/16	1/27	4,00	12,57	80,155	6,380	4		N
2-5	56	08/03/16	1 / 55							

Test Age Average Strengths (psi): 7 Day - 3960, 28 Day - 6270

52/84

Cooler, closed lid

**ASTM C511** 

Break Remarks Capping Methods

N: Unbonded Caps (ASTM C1231)

**General Remarks** 

Delivered 55 of 55 cubic yards Fibermesh

Min / Max Temp (F):

Initial Cure Method:

**Final Cure Method:** 



Test Method: ASTM C 39

Report #: CC-000006 Report Date: 7/12/2016

Sample: 3695

Field Services

2180 South Ivanhoe Street, Suite 5

Denver, CO 80222 Phone (303) 759-8100 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project:

144725UF

Geos Neighborhood 69th and Joyce Street Arvada, CO

Sample Details

Set #: Specimen Size:

4" X 8"

Technician: Cast By:

Duggan, Daniel Duggan, Daniel

Batched: Sampled: Cast:

07:31 MDT 08:15 MDT 08:30 MDT

Specimens In Set: Truck / Ticket #:

8816 / 20053147

**Date Cast:** Sampled From: 06/13/16 Chute

Truck Empty:

Contractor:

Colorado Concrete Construction

**Placement Method:** 

Chute

Location

Placement Time:

**Placement Location:** 

Curb and Gutter

**Location Details:** 

North side of 68th place, 10' east of Juniper Street

Sample Location / Notes:

**Batch Log** 

Specifications 4500 (psi)

Martin Marietta Materials Mix Design:

A4464

Strength: Air:

5.0 - 8.0 (%)

On-Site Admixtures: None

Slump: 1 - 4 (in)

Field Measurements

Weather: Sunny

Air Temperature (F): 69

Slump (in):

Concrete Temp (F):

4 (ASTM C143) 82 (ASTM C1064)

Air Content:

Plastic Unit Weight: 142.9 (lb/ft3) (ASTM C138)

**Load Volume:** 

5.4 (%) (ASTM C231)

10 (yd²) **Field Cure** 

Min / Max Temp (F):

Initial Cure Method: Final Cure Method:

Cooler, closed lid

ASTM C511

**Standard Cure** 

49/78

	Lab Test Results									
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (In)	Cylinder Area (in²)	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
3-1	7	06/20/16	2/5	4.00	12.57	45 420	3,610	5		N
3-2	28	07/11/16	2/26	4.00	12,57	57,360	4,560	4		N
3-3	28	07/11/16	2/26	4.00	12.57	57 265	4,560	4		N
3-4	28	07/11/16	2 / 26	4.00	12,57	56,885	4,530	5		N
3-5	56	08/08/16	2/54							

Test Age Average Strengths (psi): 7 Day - 3610, 28 Day - 4550

**Break Remarks** 

**Capping Methods** N: Unbonded Caps (ASTM C1231)

**General Remarks** 

Delivered 10 of 20.1 cubic yards **Fibermesh** 









TYPE 1 TYPE 2 TYPE 3 TYPE 4 TYPE 5 TYPE 6

Test Method: ASTM C 39

Report #: CC-000003 Report Date: 8/2/2016

**Sample: 4171** 

**Field Services** 

2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone (303) 759-8100

Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

Project:

144725C Geos Neighborhood 69th and Joyce Street

Arvada, CO

Sample Details

Frase, Jeremiah

Frase, Jeremiah

Set #:

Specimen Size:

Specimens In Set:

4" X 8"

1607 / 45050108

Cast By: **Date Cast:** 

Technician:

Sampled From:

Chute Chute

07/01/16

Batched: Sampled: Cast:

08:04 MDT 09:00 MDT 09:15 MDT

Truck / Ticket #: Contractor:

Colorado Concrete Construction

**Placement Method:** 

Truck Empty: **Placement Time:** 

Location

**Placement Location:** 

Crosspan

**Location Details:** 

On-Site Admixtures: None

Air Temperature (F): 70

Supplier:

Weather:

South end of crosspan at 68th and Joyce

Sample Location / Notes:

25' South of the crosspan

**Batch Log** 

Martin Marietta Materials Mlx Design:

A4464

Strength: Air:

4500 (psi) 5.0 - 8.0 (%)

**Specifications** 

Slump:

1 - 4 (in)

Field Measurements

Slump (in): Concrete Temp (F): 4 (ASTM C143) 81 (ASTM C1064) Air Content:

Plastic Unit Weight: 138.8 (lb/ft3) (ASTM C138)

**Load Volume:** 

6.4 (%) (ASTM C231) 10 (yd³)

**Standard Cure** 

Min / Max Temp (F): 62/90 **Field Cure** 

	Lab Test Results									
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
1-1	7	07/08/16	1/6	4.00	12,57	52,155	4,150	4		N
1-2	28	07/29/16	1 / 27	4.00	12.57	63,735	5,070	5		N
1-3	28	07/29/16	1 / 27	4.00	12.57	64.210	5,110	3		N
1-4	28	07/29/16	1/27	4.00	12.57	63,555	5,060	2		N
1-5	56	08/26/16	1 / 55							

Test Age Average Strengths (psi): 7 Day - 4150, 28 Day - 5080

**Break Remarks** 

**Capping Methods** N: Unbonded Caps (ASTM C1231)

**General Remarks** 

Delivered 10 of 30.10 cubic yards











Sample obtained in general conformance with ASTM C172, Compressive strength conducted in general conformance with ASTM C39. The Contractor was informed of field testing results. The Contractor is responsible for security and initial curing environment of the specimens in accordance with ASTM C31.

Test Method: ASTM C 39

Report #: CC 000004 Report Date: 8/3/2016 Sample: 4204

**Field Services** 

2180 South Ivanhoe Street, Suite 5 Denver, CO 80222

Phone (303) 759 8100

Client:

Cottonwood Park West, LLC

1240 Lehigh Street Boulder, CO 80305 Project:

144725C

Geos Neighborhood 69th and Joyce Street

Arvada, CO

Sample Details

Set #: Specimen Size:

Truck / Ticket #:

Contractor:

Weather:

4" X 8" Specimens In Set:

8303 / 20054289

Technician: Cast By:

**Date Cast:** Sampled From:

07/05/16 Chute Chute

Batched: Sampled: Cast:

09 34 MDT 10 45 MDT 11:00 MDT

Colorado Concrete

**Placement Method:** 

Frase, Jeremiah

Frase, Jeremiah

Truck Empty: **Placement Time:** 

Location

Placement Location:

Crosspan

**Location Details:** 

South end of crosspan at 69th Avenue and Juniper Street

Sample Location / Notes: **NTP** 

On-Site Admixtures: None

Air Temperature (F): 85

**Batch Log** 

Supplier:

Martin Marietta Materials Mix Design:

Concrete Temp (F):

CD4465

Strength:

Specifications 4500 (psi)

Air: Slump:

5.0 - 8 0 (%) 1 - 4 (in)

**Field Measurements** 

Slump (in):

4 (ASTM C143) 88 (ASTM C1064)

Plastic Unit Weight: 142.0 (lb/ft3) (ASTM C138)

Air Content:

6.2 (%) (ASTM C231)

Load Volume:

10 (yd³)

**Standard Cure** 

Field Cure

	Lab Test Results									
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (ibs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
2-1	7	07/12/16	2/5	4,00	12,57	56,800	4,520	4		N
2-2	28	08/02/16	2 / 26	4,00	12,57	64,270	5,110	2		N
2-3	28	08/02/16	2 / 26	4,00	12.57	66,265	5,270	2		N
2-4	28	08/02/16	2 / 26	4.00	12.57	63,365	5,040	2		N
2-5	56	08/30/16	2 / 54			41.1				

Test Age Average Strengths (psi): 7 Day - 4520, 28 Day - 5140

**Break Remarks** 

**Capping Methods** N: Unbonded Caps (ASTM C1231)

General Remarks

Delivered 10 of 20.1 cubic yards

**Fibermesh** 









Test Method: ASTM C 39

Report #: CC-000009 Report Date: 9/9/2016

**Sample: 4441** 

**Field Services** 

2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone (303) 759-8100

Client: Cottonwood Park West, LLC 1240 Lehigh Street

Boulder, CO 80305

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Project:

Sample Details Set #: Technician: Frase, Jeremiah Batched: 08.24 MDT Specimen Size: 4" X 8" Cast By: Frase, Jeremiah Sampled: 09:30 MDT Specimens In Set: 5 **Date Cast:** 07/14/16 Cast: 09:45 MDT Truck / Ticket #: 801 / 2570122 Sampled From: Chute Truck Empty: Contractor: Concrete Structure **Placement Method:** Chute **Placement Time:** Location Placement Location: Inlet Wall **Location Details:** inlet structure at north end of Pond E Sample Location / Notes: NTP **Batch Log Specifications** Mix Design: Supplier: 4531494 4500 (psi) **Bestway Concrete** Strength: On-Site Admixtures: None 5.0 - 8.0 (%) Air: Slump: 1 - 4 (in) **Field Measurements** Weather: 4 (ASTM C143) Plastic Unit Weight: 137.6 (lb/ft3) (ASTM C138) Slump (in): Air Temperature (F): 80 Air Content: Concrete Temp (F): 78 (ASTM C1064) 7.0 (ASTM C231) **Load Volume:** 4 (yd³) Standard Cure **Field Cure** 

Lab Test Results									
Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
7	07/21/16	1/6	4.00	12.57	36,140	2,880	2		N
28	08/11/16	1 / 27	4.00	12.57	50,725	4,040	2		N
28	08/11/16	1 / 27	4.00	12.57	49,490	3,940	2		N
28	08/11/16	1 / 27	4.00	12.57	48 950	3,890	2		N
56	09/08/16	1 / 55	4.00	12.57	57,080	4,540	2		N
	7 28 28 28	Age Days         Date           7         07/21/16           28         08/11/16           28         08/11/16           28         08/11/16	Age Days         Date         Cure Days           7         07/21/16         1 / 6           28         08/11/16         1 / 27           28         08/11/16         1 / 27           28         08/11/16         1 / 27           28         08/11/16         1 / 27	Test Age Days         Test Date         Field / Lab Cure Days         Average Cylinder Diameter (in)           7         07/21/16         1 / 6         4.00           28         08/11/16         1 / 27         4.00           28         08/11/16         1 / 27         4.00           28         08/11/16         1 / 27         4.00           28         08/11/16         1 / 27         4.00	Test Age Days         Test Date         Field / Lab Cure Days         Average Cylinder Diameter (In)         Cylinder Area (in²)           7         07/21/16         1 / 6         4.00         12.57           28         08/11/16         1 / 27         4.00         12.57           28         08/11/16         1 / 27         4.00         12.57           28         08/11/16         1 / 27         4.00         12.57           28         08/11/16         1 / 27         4.00         12.57	Test Age Days         Test Date         Field / Lab Cure Days         Average Cylinder Diameter (in)         Cylinder Area (in²)         Max Load (lbs)           7         07/21/16         1 / 6         4.00         12.57         36.140           28         08/11/16         1 / 27         4.00         12.57         50.725           28         08/11/16         1 / 27         4.00         12.57         49.490           28         08/11/16         1 / 27         4.00         12.57         48.950	Test Age Days         Test Date         Field / Lab Cure Days         Average Cylinder Diameter (in)         CylInder Area (in²)         Max Load (lbs)         Strength (psi)           7         07/21/16         1 / 6         4.00         12.57         36,140         2,880           28         08/11/16         1 / 27         4.00         12.57         50,725         4,040           28         08/11/16         1 / 27         4.00         12.57         49,490         3,940           28         08/11/16         1 / 27         4.00         12.57         48,950         3,890	Test Age Days         Test Date         Field / Lab Cure Days         Average Cylinder Diameter (in)         Cylinder Area (in²)         Max Load (lbs)         Strength (psi)         Fracture Type           7         07/21/16         1 / 6         4.00         12.57         36,140         2,880         2           28         08/11/16         1 / 27         4.00         12.57         50,725         4,040         2           28         08/11/16         1 / 27         4.00         12.57         49,490         3,940         2           28         08/11/16         1 / 27         4.00         12.57         48,950         3,890         2	Test Age Days         Test Date         Field / Lab Cure Days         Average Cylinder Diameter (in)         Cylinder Area (in²)         Max Load (lbs)         Strength (psi)         Fracture Type         Break Remark           7         07/21/16         1 / 6         4.00         12.57         36.140         2,880         2           28         08/11/16         1 / 27         4.00         12.57         50,725         4,040         2           28         08/11/16         1 / 27         4.00         12.57         49,490         3,940         2           28         08/11/16         1 / 27         4.00         12.57         48,950         3,890         2

Test Age Average Strengths (psi): 7 Day - 2880, 28 Day - 3960, 56 Day - 4540

74/101

Break Remarks	Capping Methods
	N: Unbonded Caps (ASTM C1231)
Consed Baseds	

General Remarks

Delivered 4 of 4 cubic yards

Min / Max Temp (F):

4-2: Ground, 4-3: Ground, 4-4: Ground



Test Method: ASTM C 39

Report #: CC-000010 Report Date: 6/28/2017

Sample: 6900

**Field Services** 

2180 South Ivanhoe Street, Suite 5

Denver, CO 80222 Phone: (303) 759-8100 Client: Project:

Cottonwood Park West, LLC 1240 Lehigh Street

Boulder, CO 80305

144725UF Geos Neighborhood

69th and Joyce Street Arvada, CO

Sample Details

Set #: Specimen Size:

5 4" X 8" Techniclan: Cast By:

Sabin, Cole Sabin, Cole

Batched: Sampled:

12:03 MDT 12:45 MDT

Specimens In Set: Truck / Ticket #:

**Date Cast:** 

10/20/16 Chute

Cast:

13:00 MDT

0610 / 20060298

Sampled From:

Truck Empty:

Contractor:

E-Z Excavating, Inc.

Placement Method:

Chute

**Placement Time:** 

Location

**Placement Location:** 

**Curb and Gutter** 

**Location Details:** 

Southwest corner of West 69th Place and Juniper Court

Sample Location / Notes: **NTP** 

**Batch Log** 

Strength:

**Specifications** 

Supplier: On-Site Admixtures: None

Martin Marietta Materials Mix Design:

CD4525

Air:

4000 (psi)

5.0 - 7.0 (%) 1 - 4 (in)

**Field Measurements** 

Slump:

Weather:

3-1/4 (ASTM C143)

Field Cure

Plastic Unit Weight: 142.9 (lb/ft³) (ASTM C138)

Air Temperature (F): 64

Slump (in): Concrete Temp (F):

77 (ASTM C1064)

Air Content:

6.2 (ASTM C231)

Load Volume:

6 (yd<sup>a</sup>)

Standard Cure

Min / Max Temp (F):

36/69

Bucket with water, open lid

**Initial Cure Method: Final Cure Method:** 

ASTM C511

				Lal	Test Resu	lts				
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
5-1	7	10/27/16	1/6	4.00	12.57	68,205	5,430	2		N
5-2	28	11/17/16	1 / 27	4.00	12.57	71,350	5,680	2		N
5-3	28	11/17/16	1/27	4.00	12.57	72,745	5,790	2		N
5-4	28	11/17/16	1/27	4.00	12.57	71,935	5,720	2		N
5-5	56	12/15/16	1/55							

Test Age Average Strengths (psi): 7 Day - 5430, 28 Day - 5730

**Break Remarks** 

**Capping Methods** N: Unbonded Caps (ASTM C1231)

General Remarks

Delivered 6 of 12 cubic yards











Test Method: ASTM C 39

Report #: CC-000011 Report Date: 6/28/2017

**Sample: 7127** 

**Field Services** 

Set #:

2180 South Ivanhoe Street, Suite 5

Denver, CO 80222 Phone (303) 759-8100 Client: Project:

Cottonwood Park West, LLC 1240 Lehigh Street

Boulder, CO 80305

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Batched:

**Sample Details** Technician: Plack, Ron

Specimen Size: 4" X 8" Cast By: Specimens In Set:

6

Date Cast: Sampled From: Plack, Ron 10/31/16 Chute

Sampled: 08:25 MDT Cast: 08:40 MDT

Truck / Ticket #: 228 / 35044336 Truck Empty: Placement Method: Contractor: E-Z Excavating, Inc. Chute Placement Time:

Location

**Placement Location:** Sidewalk

**Location Details:** 

150' east of Juniper Street, north side of West 68th Place

Sample Location / Notes: NTP

**Batch Log** 

**Specifications** 

07:09 MDT

Supplier:

Martin Marietta Materials Mlx Design:

CD4525

4000 (psi) Strength: 5.0 - 7.0 (%)

On-Site Admixtures: None

Air: Slump:

1 - 4 (in)

Field Measurements Weather: Clear Slump (in):

3-1/2 (ASTM C143)

Plastic Unit Weight: 143.2 (lb/ft3) (ASTM C138)

Air Temperature (F): 50 Concrete Temp (F): 70 (ASTM C1064)

Air Content: 5.5 (ASTM C231)

Load Volume:

**Standard Cure** 

Field Cure

10 (yd<sup>a</sup>)

Min / Max Temp (F): 45/82

				Lal	Test Resu	ts				1917
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (lbs)	Strength (psl)	Fracture Type	Break Remark	Capping Method
6-1	7	11/07/16	1/6	4.00	12.57	64,850	5,160	2		N
6-2	28	11/28/16	1 / 27	4.00	12.57	75,540	6,010	2		N
6-3	28	11/28/16	1/27	4.00	12.57	79,825	6,350	3	-	N
6-4	28	11/28/16	1/27	4.00	12.57	78,170	6,220	2		N
6-5	56	12/26/16	1 / 55							

Test Age Average Strengths (psi): 7 Day - 5160, 28 Day - 6190

**Break Remarks** 

**Capping Methods** N: Unbonded Caps (ASTM C1231)

**General Remarks** 

Delivered 10 of 40 cubic yards







Test Method: ASTM C 39

Report #: CC-000012 Report Date: 6/28/2017

Sample: 7309

**Field Services** 

2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone (303) 759-8100

Client:

Project:

Cottonwood Park West, LLC

1240 Lehigh Street Boulder, CO 80305 144725UF

Geos Neighborhood 69th and Joyce Street

Arvada, CO

Sample Details

Set #: Specimen Size:

4" X 8"

Technician:

Cast By:

Granato, Michael Granato, Michael

Batched: Sampled: 09:08 MDT 10:10 MDT

Specimens In Set: Truck / Ticket #:

0552 / 45055991

**Date Cast:** Sampled From:

11/04/16 Chute

Cast:

10:25 MDT

Contractor:

E-Z Excavating, Inc.

Placement Method:

Chute

Truck Empty: **Placement Time:** 

Location

Placement Location:

**Curb and Gutter** 

**Location Details:** 

West 69th Place, eastbound, 40' west of Juniper Court

Sample Location / Notes:

**Batch Log** 

CD4525

Strength:

**Specifications** 4000 (psi)

Supplier:

Martin Marietta Materials Mix Design:

Air:

5.0 - 7.0 (%) 1 - 4 (in)

On-Site Admixtures: None

Field Measurements

Slump:

Weather: Air Temperature (F): 57 Slump (in):

2-1/2 (ASTM C143)

Plastic Unit Weight: 143.9 (lb/ft3) (ASTM C138)

Concrete Temp (F):

70 (ASTM C1064)

Air Content:

Field Cure

5.1 (ASTM C231)

Load Volume:

10 (yd3)

**Standard Cure** 

Initial Cure Method: **Final Cure Method:** 

Cooler, closed lid

ASTM C511

				Lat	Test Resu	lts				
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
7-1	7	11/11/16	1/6	4.00	12.57	55,400	4,410	2		N
7-2	28	12/02/16	1 / 27	4.00	12.57	76,875	6,120	2		N
7-3	28	12/02/16	1 / 27	4,00	12.57	73,660	5,860	2		N
7-4	28	12/02/16	1/27	4,00	12.57	79,505	6,330	2		N
7-5	56	12/30/16	1 / 55							

Test Age Average Strengths (psi): 7 Day - 4410, 28 Day - 6100

**Break Remarks** 

**Capping Methods** N: Unbonded Caps (ASTM C1231)

**General Remarks** 

Delivered 10 of 20.1 cubic yards













## A.G. Wassenaar Consulting Engineers Geotechnical, Environmental and Related Services

## **Compressive Strength of Concrete**

Test Method: ASTM C 39

Report #: CC-000013 Report Date: 6/28/2017

Sample: 7554

Field Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone: (303) 759-8100 Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

144725UF Geos Neighborhood 69th and Joyce Street Arvada CO

Project:

Sample Details Set #: 8 Technician: Knauff, Stephen Batched: 08:18 MST Specimen Size: 4" X 8" Cast By: Knauff, Stephen Sampled: 09:15 MST Specimens In Set: **Date Cast:** 11/14/16 Cast: 09 30 MST Truck / Ticket #: 0229 / 35044773 Sampled From: Chute Truck Empty: Contractor: **Placement Method:** Colorado Concrete, Inc. Chute **Placement Time:** Location **Placement Location:** Sidewalk **Location Details:** Northbound, Juniper Court, 140' south of West 69th Place Sample Location / Notes: **Batch Log Specifications** Martin Marietta Materials Mix Design: Supplier: A4464 4000 (psi) Strength: On-Site Admixtures: None 5.0 - 8.0 (%) Alr: Slump: 1 - 4 (in) **Field Measurements** Weather: Slump (in): Clear 4 (ASTM C143) Plastic Unit Weight: 135.7 (lb/ft3) (ASTM C138) Air Temperature (F): 63 Concrete Temp (F): 71 (ASTM C1064) Air Content: 7.8 (ASTM C231) Load Volume: 10 (yd³) **Standard Cure Field Cure** Min / Max Temp (F): 52/90

				Lal	Test Resul	its				
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (In)	Cylinder Area (in²)	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
8-1	7	11/21/16	1/6	4.00	12,57	39,405	3,140	2		N
8-2	28	12/12/16	1 / 27	4.00	12,57	52,510	4,180	2		N
8-3	28	12/12/16	1/27	4.00	12.57	54,560	4,340	2		N
8-4	_ 28	12/12/16	1 / 27	4.00	12.57	54,020	4,300	2		N
8-5	56	01/09/17	1/55	·						
Test Age A	verage Stre	anaths (nsi)	: 7 Day - 314	0. 28 Day - 4270						

Test Age Average Strengths (psi): 7 Day - 3140, 28 Day - 4270

Break Remarks

Capping Methods

N: Unbonded Caps (ASTM C1231)

General Remarks

Delivered 10 of 20.1 cubic yards



Test Method: ASTM C 39

Report #: CC-000005 Report Date: 6/28/2017

**Sample: 7535** 

**Field Services** 

2180 South Ivanhoe Street, Suite 5

**Denver, CO 80222** Phone: (303) 759-8100 Client: Project:

Cottonwood Park West, LLC 144725C 1240 Lehigh Street

Geos Neighborhood Boulder, CO 80305 69th and Joyce Street Arvada, CO

Sample Details

Set #: Techniclan: Abbott, Shane Batched: 06 55 MST Specimen Size: 4" X 8" Cast By: Abbott, Shane Sampled: 08:15 MST Specimens In Set: 5 **Date Cast:** 11/11/16 Cast: 08 30 MST

Truck / Ticket #: 1515 / 46031589 Sampled From: Chute Truck Empty: Contractor: E-Z Excavating, Inc. **Placement Method:** Chute **Placement Time:** 

Location

Placement Location: Sidewalk

**Location Details:** West 69th Avenue, 25' west of Joyce Street, westbound lane

Sample Location / Notes: NTP

**Batch Log Specifications** Martin Marietta Materials Mix Design: Supplier: 4500 (psi) A4464 Strength:

On-Site Admixtures: None Air: 5.0 - 8.0 (%) Slump: 1 -4 (in)

**Field Measurements** 

Weather: 4 (ASTM C143) Slump (in): Plastic Unit Weight: 140.9 (lb/ft²) (ASTM C138)

Air Temperature (F): 42 Concrete Temp (F): 72 (ASTM C1064) Air Content: 8.0 (ASTM C231)

**Load Volume:** 10 (yd²)

Standard Cure Field Cure Min / Max Temp (F): 42/67

				Lai	b Test Resul	ts				
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (lbs)	Strength (psl)	Fracture Type	Break Remark	Capping Method
3-1	7	11/18/16	1/6	4 00	12,57	54,475	4,330	2		N
3-2	28	12/09/16	1 / 27	4 00	12,57	62,785	5,000	2		N
3-3	28	12/09/16	1 / 27	4 00	12.57	68,960	5,490	3		N
3-4	28	12/09/16	1 / 27	4.00	12.57	63,470	5,050	3		N
3-5	56	01/06/17	1 / 55							

Test Age Average Strengths (psi): 7 Day - 4330, 28 Day - 5180

**Break Remarks Capping Methods** N: Unbonded Caps (ASTM C1231) **General Remarks** 

Delivered 10 of 60.1 cubic yards





Test Method: ASTM C 39

Report #: CC-000014 Report Date: 6/28/2017 Sample: 3636

Field Services

2180 South Ivanhoe Street, Suite 5

Denver, CO 80222 Phone: (303) 759-8100 Client: Project:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305

144725UF Geos Neighborhood 69th and Joyce Street Arvada, CO

Sample Details

Set #: Specimen Size:

4" X 8"

Technician: Cast By: **Date Cast:** 

Duggan, Daniel Duggan, Daniel 06/08/16

Batched: Sampled: Cast:

12 12 MDT 13 20 MDT 13 35 MDT

Specimens In Set: Truck / Ticket #:

Contractor:

1608 / 46026739 Colorado Concrete

Construction

Sampled From: Placement Method:

Chute Chute Truck Empty: **Placement Time:** 

Location

Placement Location:

**Curb and Gutter** 

**Location Details:** 

North side of 68th Place, 25' east of Juniper Street

Sample Location / Notes:

**Batch Log** 

Concrete Temp (F):

Strength:

**Specifications** 4500 (psi)

Supplier:

Martin Marietta Materials Mix Design:

A4461

Air:

5.0 - 8.0 (%)

On-Site Admixtures: None

Slump:

1 -4 (in)

**Field Measurements** 

Weather: Air Temperature (F): 83

Sunny

Slump (in):

2-1/2 (ASTM C143) 82 (ASTM C1064)

Air Content:

Plastic Unit Weight: 144.1 (lb/ft²) (ASTM C138)

**Load Volume:** 

5.9 (ASTM C231)

10 (yd3) **Field Cure** 

Min / Max Temp (F):

**Standard Cure** 52/84

**Initial Cure Method: Final Cure Method:** 

Cooler, closed lid

**ASTM C511** 

				Lat	Test Resul	ts				
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (In)	Cylinder Area (in²)	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
1-1	7	06/15/16	1/6	4.00	12.57	40,655	3,230	5		N
1-2	28	07/06/16	1 / 27	4.00	12.57	61,160	4,870	4		N
1-3	28	07/06/16	1 / 27	4.00	12.57	63,905	5,080	1		N
1-4	28	07/06/16	1/27	4.00	12.57	60,945	4,850	4		N
1-5	56	08/03/16	1 / 55							

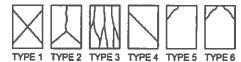
Test Age Average Strengths (psi): 7 Day - 3230, 28 Day - 4930

**Break Remarks** 

**Capping Methods** N: Unbonded Caps (ASTM C1231)

**General Remarks** 

Delivered 10 of 80.1 cubic yards



Test Method: ASTM C 39

Report #: CC-000002 Report Date: 2/10/2017

Sample: 8276

Fleid Services

2180 South Ivanhoe Street, Suite 5

Denver, CO 80222 Phone (303) 759-8100 Client: Project:

E-Z Excavating, Inc. 170023

PO Box 1439 Geo's Subdivision Longmont, CO 80502-1439 E-Z Excavating Arvada, CO

Sample Details

Set #: Specimen Size:

4" X 8"

Technician: Cast By:

Norelius, Jarod Norelius, Jarod Batched: Sampled: Cast:

11:04 MST 11:55 MST 12:10 MST

Specimens In Set: Truck / Ticket #:

Contractor:

1511 / 45058206 Colorado Concrete

**Date Cast:** Sampled From: Placement Method: 01/13/17 Chute Chute

Truck Empty:

Construction

Location

**Placement Time:** 

**Placement Location:** 

Sidewalk

**Location Details:** 

West 69th Place, south sidewalk, 50' east of Juniper Court

Sample Location / Notes:

NTP

**Batch Log** 

**Specifications** 4500 (psi)

Supplier: On-Site Admixtures: None

Martin Marietta Materials Mix Design:

A4464

Strength: Air: Slump:

5.0 - 8.0 (%)

1 - 4 (in)

6.5 (yd³)

Field Measurements

Weather: Sunny Air Temperature (F): 35

Slump (in):

Concrete Temp (F):

4 (ASTM C143) 68 (ASTM C1064)

Plastic Unit Weight: 138.7 (lb/ft3) (ASTM C138)

Air Content: **Load Volume:**  7.2 (ASTM C231)

**Field Cure** 

Min / Max Temp (F):

Initial Cure Method:

Cooler, closed lid

**Standard Cure** 

38/53

**Final Cure Method:** 

ASTM C511

				Lat	Test Resul	its				
Specimen Number	Test Age Days	Test Date	Field / Lab Cure Days	Average Cylinder Diameter (in)	Cylinder Area (in²)	Max Load (lbs)	Strength (psi)	Fracture Type	Break Remark	Capping Method
1-1	7	01/20/17	1/6	4,00	12.57	47,190	3,750	2		N
1-2	28	02/10/17	1/27	4.00	12 57	57,300	4,560	2		N
1-3	28	02/10/17	1/27	4.00	12.57	60,070	4,780	3		N
1-4	28	02/10/17	1/27	4.00	12.57	60,675	4,830	2		N
1-5	56	03/10/17	1/55							

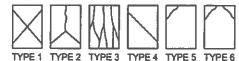
Test Age Average Strengths (psi): 7 Day - 3750, 28 Day - 4720

**Break Remarks** 

**Capping Methods** N: Unbonded Caps (ASTM C1231)

**General Remarks** 

Delivered 6.25 of 6.25 cubic yards



## **SECTION 3**



**Asphalt Testing** 

Report #: AT-000001 Report Date: 7/5/2017 Test Method: D2950 Client:
Cottonwood Park West, LLC
1240 Lehigh Street
Boulder, CO 80305

Project:

144725A Geos Neighborhood 69th and Joyce Street Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 60222 Phone: (303) 759-8100

		_					Test R	suits							
Test#	Retes	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Wet Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
1		11/11/16	Asphalt: Bottom Lift: West 68th Place, eastbound, 500' east of Juniper Court	S	40013- 16		156.5	1 / RICE ASTM D2041	145.0	Backscatter	93	92 / 96		36855	Granato, Michael
2		11/11/16	Asphalt: Bottom Lift: West 68th Place, westbound, 125' east of Juniper Court	S	40013- 16		156.5	1 / RICE ASTM D2041	144.5	Backscatter	92	92 / 96		36855	Granato, Michael
3		11/11/16	Asphalt: Bottom Lift: West 68th Place, westbound, 375' east of Juniper Court	S	40013- 16		156.5	1 / RICE ASTM D2041	146.1	Backscatter	93	92 / 96		36855	Granato, Michael
4		11/11/16	Asphatt: Bottom Lift: Juniper Court, southbound, 375' north of West 68th Place	S	40013- 16		156.5	1 / RICE ASTM D2041	146.0	Backscatter	93	92 / 96	,	36855	Granato, Michael
5		11/11/16	Asphalt: Bottom Lift: Juniper Court, southbound, 125' north of West 68th Place	S	40013- 16		156.5	1 / RICE ASTM D2041	143.2	Backscatter	92	92 / 96		36855	Granato, Michael
6		11/11/16	Asphalt: Bottom Lift: Juniper Court, northbound, 250' north of West 68th Place	S	40013- 16		156.5	1 / RICE ASTM D2041	144.6	Backscatter	92	92 / 96		36855	Granato, Michael
	1 18		Remark	3			QUE NO				С	Comments			
	(1)								Direct Tran	smission" (Me	ethod A) un	less probe	depth is no	ted as "Backs	catter"
_	- I		la					uge Information							
Gauge		Make	Model		Density C		Moisture Cou	int S	Standard C	Count Date	te Last Calibration Date Calibrated By				
3685	5	roxier	3430		2245		760		11/1	1/16	7/21/16				



Field Services 2180 South (vanhoe Street, Suite 5

Denver CO 80222 Phone (303) 759-8100

## **Asphalt Testing**

Report #: AT-000002 Report Date: 7/5/2017 Test Method: D2950 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725A

Geos Neighborhood 69th and Joyce Street

	l lis			10 177			Test R	esuits							
Test#	Retest Of	Test Date	Test Location	Material	Mlx Design	Thickness (in)	Max Wet Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
7		11/12/16	Asphalt: Bottom Lift: Juniper Court, northbound, 500' north of West 68th Place	S	40013- 16		159.0	2 / RICE ASTM D2041	145.2	Backscatter	91	92 / 96		36855	Granato, Michae
8		11/12/16	Asphalt: Bottom Lift: West 68th Place, eastbound, 250' east of Juniper Court	S	40013- 16		159.0	2 / RICE ASTM D2041	143 9	Backscatter	91	92 / 96		36855	Granato, Michae
	100		Remark	3							С	omments			
	3 170							Tests are "	Direct Tran	ismission" (Me	ethod A) ur	iless probe	depth is no	oted as "Backs	catter"
	V. CI						Gauge Inf	ormation							
Gauge	SN N	lake	Model		Density 0	Count I	Moisture Co	unt :	Standard (	Count Date	Last	Calibratio	n Date	Calibrated B	у
3685	5 T	roxler	3430		2250	)	763		11/1	2/16		7/21/16		<del>                                     </del>	



**Asphalt Testing** 

Report #: AT-000003 Report Date: 7/5/2017 Test Method: D2950 Client:

Cottonwood Park West, LLC 1240 Lehigh Street Boulder, CO 80305 Project:

144725A Geos Neighborhood 69th and Joyce Street

Arvada, CO

Field Services 2180 South Ivanhoe Street, Suite 5 Denver, CO 80222 Phone (303) 759-8100

	13						Test R	esults							
Test#	Retest	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Wet Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
9		11/14/16	Asphalt: Top Lift: Northbound Janice Court, 450' South of West 69th Place	SX	40053- 16		155.2	3 / RICE ASTM D2041	151.1	Backscatter	97	92 / 96		21919	Knauff, Stephen
10			Asphalt: Top Lift: Eastbound Juniper Court, 100' West of West 69th Avenue	SX	40053- 16		155.2	3 / RICE ASTM D2041	156,7	Backscatter	101	92 / 96		21919	Knauff, Stephen
	13		Remark	ks							С	omments			
	11.							Tests are "	Direct Tran	nsmission" (Me	ethod A) ur	iless probe	depth is no	ited as "Backs	catter*
							Gauge Inf	ormation							
Gauge	SN	<b>Aake</b>	Model		Density (	Count I	Moisture Co	unt :	Standard (	Count Date	Last	Calibratio	n Date	Calibrated B	у
2191	19 1	roxler	3430		2178	3	715		11/1	4/16	1	5/3/17			

Geotechnical and Environmental Consultants

2180 South Ivanhoe Street, Suite 5 Denver, Colorado 80222-5710 303-759-8100 Fax 303-756-2920 www.agwassenaar.com

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CLIENT: PROJECT NAM

Cottonwood Park West, LLC

PROJECT NAME: Geos Neighborhood LOCATION: Arvada, Colorado

DATE: December 22, 2016 PROJECT NUMBER: 144725

### **ASPHALT MIX DESIGN SUMMARY**

Supplier			T	1	
	Brannan Sand and Gravel	Brannan Sand and Gravel			
Paving Contractor	Brannan Sand and Gravel	Brannan Sand and Gravel			
Mix I.D.	40013-16	40053-16			
Міх Туре	S	SX			
Asphalt Content (%)	4.90	5.3		:	
Theo Max Spg	2.503	2.491			
Theo Max Density / Marshall Unit Wt. (pcf)	155.8	155.1			
Sieve Analysis					
1 1/2"	100	100			
1"	100	100			
3/4"	97	100			
1/2"	81	97			
3/8"	75	89			
#4	64	68			
#8	49	55			
#16	38	41			
#30	27	29			
#50	15	18			
#100	10	11			
#200	6.4	7.0			
Air Voids (%)					
N (initial)					
N (design)	3.8	3.8			
Marshall Properties					
Stability (lbs.)					
Flow (0.01 in.)					
Specified Compaction	92 to 96	92 to 96			

Geotechnical and Environmental Consultants

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CLIENT:

Cottonwood Park West, LLC

PROJECT NAME: Geos Neighborhood LOCATION: Arvada, Colorado

DATE: December 22, 2016 PROJECT NUMBER: 144725

### **ASPHALT LABORATORY TESTING SUMMARY**

Sample No.	1	2	3	
Date	11/11/16	11/12/16	11/14/16	
Location	West 68th Place, eastbound, 500' east of Juniper Court	Juniper Court, northbound, 250' north of West 68th Place	Juniper Court, northbound, 450' south of West 69th Place	
Lift	Bottom	Bottom	Тор	
Mix I.D.	40013-16	40013-16	40053-16	
Міх Туре	S	S	SX	
Asphalt Content (%)	4.96	4.69	5.41	
Theo Max Spg	2.514	2.555	2.493	
Theo Max Density / Marshall Unit Wt. (pcf)	156.5	159.0	155.2	
Sieve Analysis				
1 1/2"	100	100	100	
1"	100	100	100	
3/4"	97	90 *	100	
1/2"	81	72 *	97	
3/8"	76	66 *	89	
#4	67	55 *	68	
#8	54	44	54	
#16	42	35	41	
#30	32 *	26	30	
#50	21	18	19	
#100	12	11	12	
#200	7.9	7.0	7.3	
Voids N (design)	4.32	5.08	4.5	
Lottman (CP-L5109)				
Voids Con/Unc	0.0	0.0	0.0	
Strength Con/Unc	0.0	0.0	0.0	
TSR (%)	0	0	0	

<sup>\*</sup> Indicates out of tolerance

Niether an asphalt content nor an aggregate gradation correction factor has been applied.