



November 28, 2022

Mr. Michael Waugh
 Engineering Inspection Supervisor
 Town of Parker
 20120 East Mainstreet
 Parker, Colorado 80138-7335

**RE: Compark Village South, Filing 2
 Pavement Coring and Density Testing
 Town of Parker, Colorado**

Dear Mr. Waugh:

This letter presents a summary of Geocal's roadway pavement coring results for the Compark Village South, Filing 2. Our field work and laboratory testing program were conducted in accordance with the subconsultant agreement with the Town of Parker dated January 11, 2019, and in general accordance with Section 9.3.2 of the Town of Parker Roadway Design and Construction Criteria Manual, dated May 2018 (Parker Specifications).

Geocal cored and collected the pavement cores for this project on November 8, 2022 and transported the cores to our Centennial laboratory for density testing. Wherever the core thickness was less than the design thickness, we offset a short distance and collected additional cores. A total of 13 cores were collected, at the approximate locations shown on the Attachment. After coring, the pavement was patched with asphalt cold patch material compacted in lifts to the original thickness of the pavement. A summary of the roadway segments tested, and pavement cores collected is provided in the following table:

Roadway	Approximate Length (ft)	Number of Lanes	Number of Pavement Cores
Deertrack Lane	1600	2	9
Lynx Cat St	235	2	2
Badger Run St	263	2	2

Based on information provided by the Town of Parker, the pavement sections for Compark Village South Filing 2 consist of a top lift of grading SX (75) PG (58-28) and the lower lifts consisting of grading S (75) PG (58-28). The mix designs indicate a maximum theoretical specific gravity of 2.485 for the SX Mix and a maximum theoretical specific gravity of 2.503 for the S Mix. The adjusted Maximum Theoretical Specific Gravity for the pavement cores was calculated based on the weighted average of the lift thicknesses measured for each core. The laboratory test results are included in the Attachment 2, Bulk Specific Gravity of Compacted Bituminous Mixtures Test Results. A summary of the design thickness, average core thickness and average core percent compaction for each roadway is provided in the following table:

Roadway	Design Pavement Thickness (inches)	Average Core Thickness (inches) (% Design)	Average Core % Compaction
Deertrack Lane	5	5.52 (110)	93.4
Lynx Cat St	6	6.63 (111)	92.6
Badger Run St	6	7.1 (118)	94.1

Page 2 of 2
Mr. Michael Waugh
Engineering Inspection Supervisor - Town of Parker, Colorado
Compark Village South, Filing 2
Pavement Core Summary

Section 9.3.2 of the Town of Parker Specifications state that ninety (90) percent of the cores must meet or exceed the pavement design thickness. For Filing 7 roadways, approximately 86.6 % of the cores met this requirement. The average core thickness was greater than the design thickness for each roadway.

The Specifications also state that no single core shall be less than 85% of the pavement design thickness and based on the cores we collected, all of the cores satisfied this specification. Based on the adjusted Maximum Theoretical Specific Gravity, which was calculated based on the lift thicknesses measured, three (3) of the cores tested were outside of the 92% - 96% of Maximum Theoretical Specific Gravity compaction specification.

We appreciate the opportunity to assist with this project. If you have any questions or need additional information, please feel free to give us a call.

Sincerely,

GEOCAL



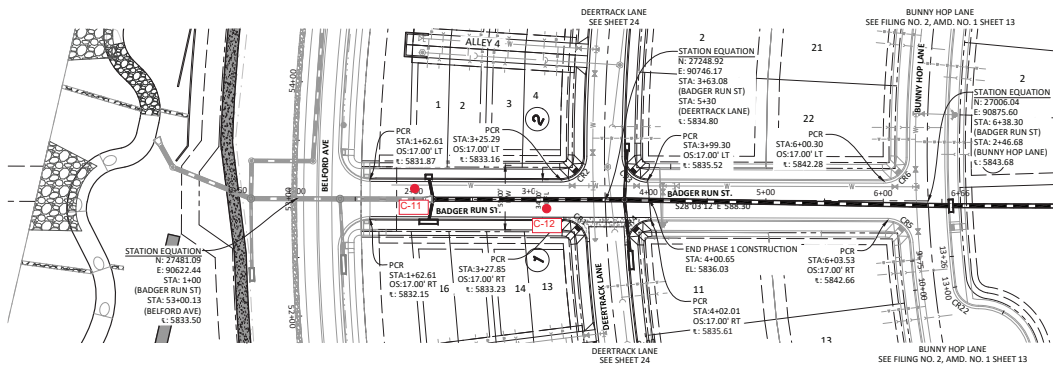
By: Shamshad Hussain, PhD, PE
Senior Project Manager



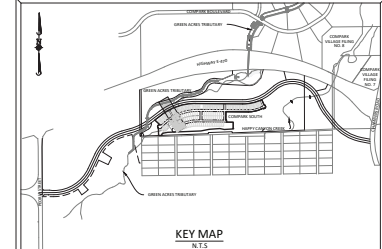
Reviewed by: Nur Hossain, PhD, PE
Principal

SH/M22.1886.030

Attachment: Locations of Pavement Cores & Bulk Specific Gravity of Compacted Bituminous Mixtures Test Results.



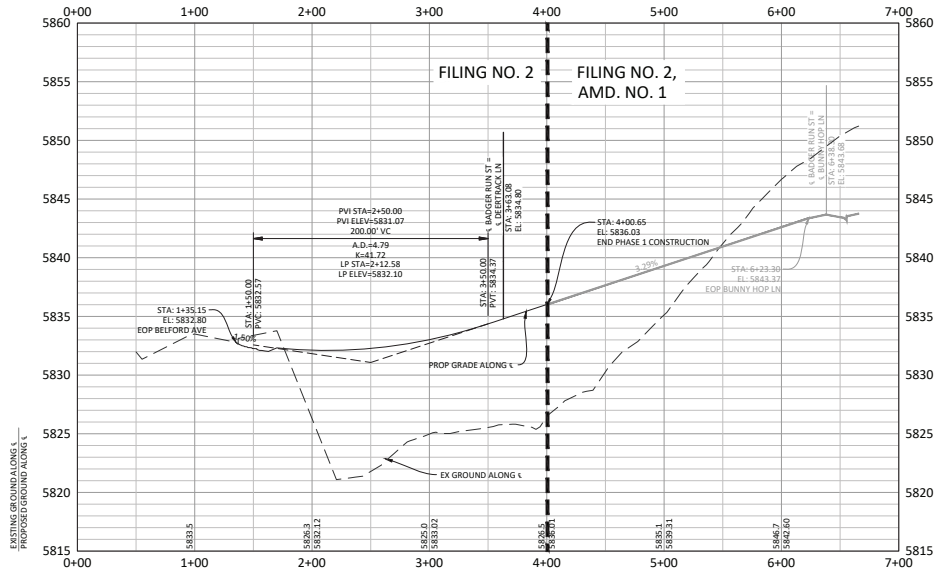
BADGER RUN ST.



SOURCE BENCHMARKS:
 DOUGLAS COUNTY BM 1.115010
 A DOUGLAS COUNTY G.S. MONUMENT SET IN CONCRETE LOCATED APPROXIMATELY 130 FEET SOUTHWESTERLY OF THE CENTERLINE OF CHAMBERS ROAD AND 95 FEET NORTHWESTERLY OF THE CENTERLINE OF COMPARK BOULEVARD. ELEVATION = 5752.84 (NAVD 88)

CURVE TABLE

Curve #	LENGTH	RADIUS	DELTA	CHORD DIRECTION	CHORD LENGTH
CR1	30.16'	20.00'	86°24'53"	S15° 09' 14.72"W	30.16
CR2	31.55'	20.00'	90°22'32"	N73° 14' 28.16"W	31.55
CR3	31.38'	20.00'	89°36'07"	S16° 44' 51.75"W	31.38
CR4	32.74'	20.00'	93°47'53"	N74° 57' 08.47"W	32.74
CR5	29.84'	20.00'	85°28'17"	N14° 40' 56.56"E	29.84
CR6	31.58'	20.00'	90°28'28"	S73° 17' 25.76"E	31.58



SCALE: 1"=50'
 VERTICAL SCALE: 1"=5'

- GENERAL ROADWAY NOTES:**
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION, AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
 - REFER TO GENERAL NOTES ON SHEET 2 FOR ALL APPLICABLE CONSTRUCTION STANDARDS.
 - ALL ROAD ELEVATIONS SHOWN IN PROFILE ARE CENTERLINE UNLESS OTHERWISE NOTED.
 - ALL STATIONING OFFSETS ARE TAKEN FROM CENTERLINE UNLESS OTHERWISE NOTED. REFER TO FINAL PLAN FOR RIGHT-OF-WAY AND CENTERLINE DIMENSIONS AND HORIZONTAL CONTROL.
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Town of Parker, Director of Engineering _____ Date: 02/24/2021

Manhard CONSULTING
 1700 S. W. 10th Ave., Suite 100, Fort Lauderdale, FL 33315
 P: 954.575.1100 F: 954.575.1101
 www.manhardconsulting.com

PROJECT INFORMATION:

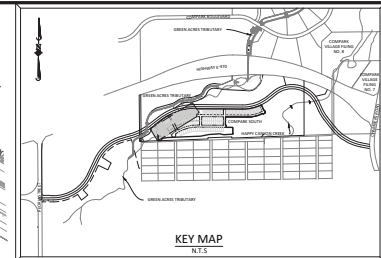
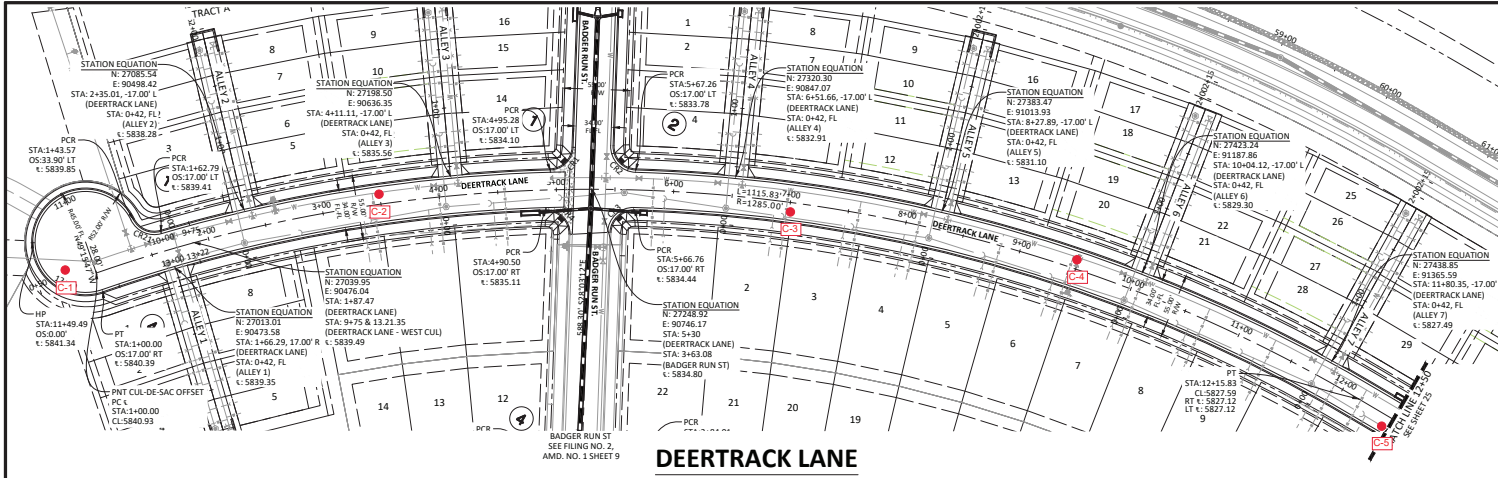
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PROJECT NAME	COMPARK VILLAGE SOUTH FILING NO. 2
CLIENT	TOWN OF PARKER, COLORADO
DATE	02/24/2021
DESIGNER	BAK
CHECKER	BAK
DATE	02/20/2021
PROJECT LOCATION	COMPARK VILLAGE SOUTH FILING NO. 2
PROJECT TYPE	STREET ROADWAY PLAN & PROFILE
PROJECT STATUS	ISSUED FOR PERMIT
PROJECT PHASE	CONSTRUCTION MANAGEMENT

COMPARK VILLAGE SOUTH FILING NO. 2
TOWN OF PARKER, COLORADO
BADGER RUN STREET ROADWAY PLAN & PROFILE

37642
 10-30-2020

PROJ. NO.: 2020-001
 PROJ. ASSOC.: BAK
 DRAWN BY: BAK
 DATE: 02/20/21

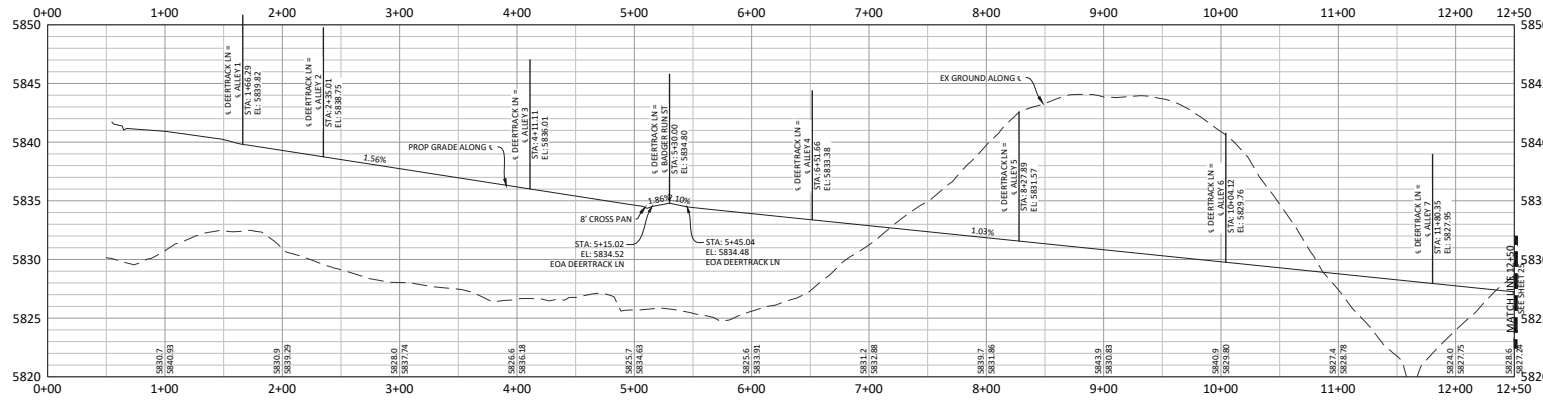
SHEET
22 OF 43
 CLCPK3



SOURCE BENCHMARKS:

DOUGLAS COUNTY BM 1.115010
 A DOUGLAS COUNTY G5 MONUMENT SET IN CONCRETE LOCATED APPROXIMATELY 130 FEET
 SOUTHWESTERLY OF THE CENTERLINE OF CHAMBERS ROAD AND 95 FEET NORTHWESTERLY OF
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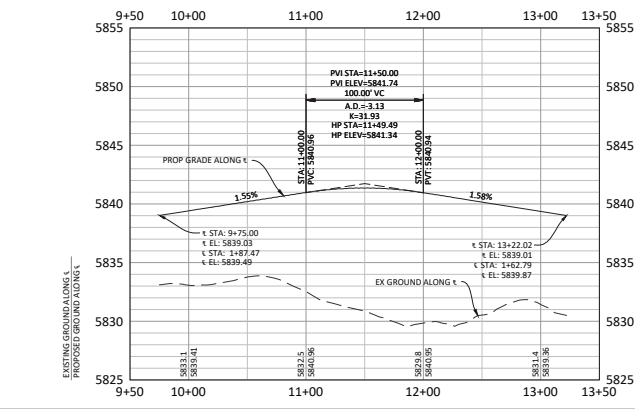
DEERTRACK LANE



SCALE: 1"=50'
 VERTICAL SCALE: 1"=5'

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CUL-DE-SAC FLOWLINE PROFILE

CURVE TABLE					
Curve #	LENGTH	RADIUS	DELTA	CHORD DIRECTION	CHORD LENGTH
CR1	30.16'	20.00'	86°24'53"	S15° 09' 14.72"W	30.16
CR2	31.55'	20.00'	90°22'32"	N73° 14' 28.16"W	31.55
CR3	31.28'	20.00'	89°36'07"	S16° 44' 51.75"W	31.28
CR4	32.74'	20.00'	93°47'53"	N74° 57' 08.47"W	32.74
CR21	28.15'	20.00'	80°38'37"	S83° 51' 30.76"W	28.15



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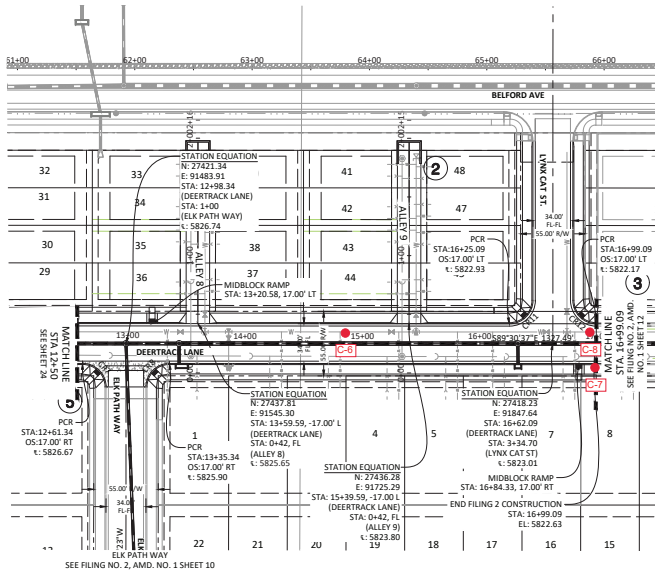
Town of Parker, Director of Engineering
 Date: 02/24/2021

Manhard CONSULTING
 7700 East Orchard Road, Suite 100, Greenwood Village, CO 80120
 Civil Engineering, Surveying & Geospatial Services | 303.755.6151
 Water Resource Management | Construction Management

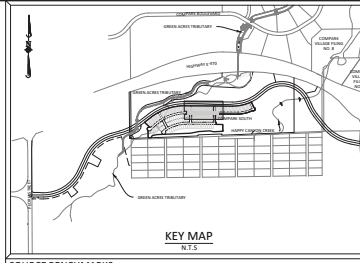
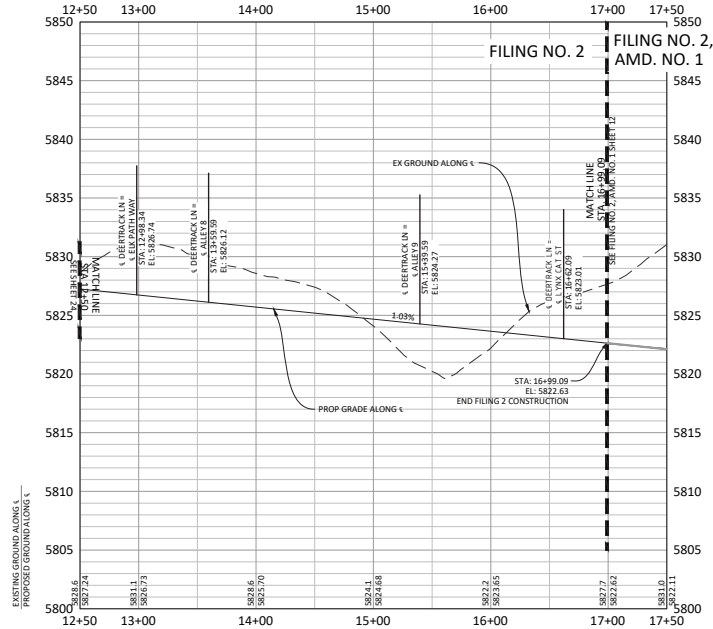
COMPARK VILLAGE SOUTH FILING NO. 2
 TOWN OF PARKER, COLORADO
 DEERTRACK LANE ROADWAY PLAN & PROFILE

DATE: 02/24/2021
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 PROJECT: 17022020-01-PAR
 DRAWN BY: BAE
 CHECKED BY: BAE
 DATE: 02/25/21

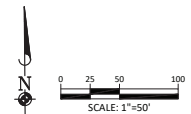
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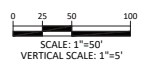
DEERTRACK LANE



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A DOUGLAS COUNTY GS MONUMENT SET IN CONCRETE LOCATED APPROXIMATELY 130 FEET
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THE CENTERLINE OF COMPARK BOULEVARD. ELEVATION = 5752.84 (NAVD 88)



CURVE TABLE					
Curve #	LENGTH	RADIUS	DELTA	CHORD DIRECTION	CHORD LENGTH
CR7	31.42'	20.00'	90°00'00"	N44° 30' 36.99"W	31.42
CR8	31.42'	20.00'	90°00'00"	S45° 29' 23.01"W	31.42
CR11	31.42'	20.00'	90°00'00"	S45° 29' 23.01"W	31.42
CR12	31.42'	20.00'	90°00'00"	N44° 30' 36.99"W	31.42



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Town of Parker, Director of Engineering
Date: 02/24/2021

Manhard CONSULTING
Civil Engineering | Surveying & Geospatial Services | Construction Management | Construction Management

PROJECT NO. 19-0001
SHEET NO. 25 OF 43
DATE: 02/24/2021

COMPARK VILLAGE SOUTH FILING NO. 2
TOWN OF PARKER, COLORADO
DEERTRACK LANE ROADWAY PLAN & PROFILE

37642
10-30-2020

PROJ. NO.: 19-0001
PROJ. ASSOC.: RAK
DRAWN BY: RAK
DATE: 02/24/21

SHEET
25 OF 43
CLCPK3



Bulk Specific Gravity of Compacted Bituminous Mixtures

Compark Village Douth, Filing 2 AASHTO T 166

7290 S. Fraser Street
Centennial, Colorado 80112
Phone: 303-337-0338
Fax: 303-337-0247

Client: Town of Parker
Project: Looking Glass Subdivision Filing 7
Project Number: M22.1886.030
Lab Number: 9172
Coring Date: 11/8/2022

Tested By: DH
Checked By: SH

1) Weighted average based on lift thicknesses of SX and S mixes for Maximum Theoretical Specific Gravity (S Mix = 2.503, SX Mix = 2.485).

2) 92% -96% of Maximum Theoretical Specific Gravity Specified.

Core ID	Location	Notes	Design Thickness (in.)	Core Thickness (in.)	Top Lift Thickness (SX Mix) (in.)	Bulk Specific Gravity	Adjusted Maximum Theoretical Specific Gravity ¹	Core Unit Weight (pcf.)	Percent Compaction ² (%)
1	Deertrack Lane 1A of Lot 4 EB C		5	5.34	1.97	2.259	2.496	141.0	90.5
2	Deertrack Lane 12DA of Lot 1 WB LWP		5	4.56	2.43	2.366	2.493	147.6	94.9
2R	Deertrack Lane 12DA of Lot 1 WB LWP	Retest	5	4.58	2.33	2.366	2.494	147.6	94.9
3	Deertrack Lane 3A of Lot 5 EB C		5	5.89	2.90	2.356	2.494	147.0	94.5
4	Deertrack Lane 20DA of Lot 2 WB C		5	5.48	2.52	2.333	2.495	145.6	93.5
5	Deertrack Lane 11A of Lot 5 EB RWP		5	5.73	2.25	2.358	2.496	147.1	94.5
6	Deertrack Lane 44DA of Lot 2 WB C		5	5.71	2.58	2.343	2.495	146.2	93.9
7	Deertrack Lane 8A of Lot 6 EB C		5	6.60	3.08	2.310	2.495	144.1	92.6
8	Deertrack Lane 4DA of Lot 3 WB RWP		5	5.79	2.38	2.272	2.496	141.8	91.0
1	Lynx Cat St 1DA of Lot 2 NB LWP		6	6.35	2.36	2.281	2.496	142.3	91.4
2	Lynx Cat St 45DB of Lot 2 SB RWP		6	6.91	2.83	2.342	2.496	146.1	93.8
1	Badger Run St 1DB of Lot 2 NB C		6	6.83	3.03	2.349	2.495	146.6	94.1
2	Badger Run St 13DB of Lot 1 SB LWP		6	7.36	3.25	2.349	2.495	146.6	94.1
	RWP = Right Wheel Path, LWP = Left Wheel Path, C = Center of Lane EB = East Bound, WB = West Bound, NB = North Bound, SB = South Bound								