Stantec

Memo

To:	Hugo Lalonde Barrhaven Conservancy Development Corporations	From:	Melissa Nelson / Alexandre Mineault-Guitard Stantec Consulting Ltd.
Project/File:	163401964	Date:	April 19, 2024

Reference: Caivan Barrhaven Conservancy East Development - Initial Review Assessment

1 Overview

Stantec previously completed the Barrhaven Conservancy East Water Distribution System Analysis report in June 2022 in support of David Schaeffer Engineering Limited (DSEL)'s update to Design Brief for the subject lands. Stantec's June 2022 report summarized the results of the conceptual water servicing analysis in support of servicing for Phases 2, 3, 4 and Jock River of the Barrhaven Conservancy East development as depicted by the original site plan (dated October 13, 2021).

DSEL is currently advancing the functional design for Phases 3 and 4 of the Barrhaven Conservancy East Development, which includes phasing changes, as well as revisions to the proposed road layout and unit configurations. To support DSEL's efforts, Stantec compared the original concept plan with the latest plan dated March 7, 2024.

This memo summarizes the changes in unit counts, and associated water demands from what was previously considered in Stantec's 2022 Study.

1.1 Concept Plan Layout & Phasing Comparison

In addition to the changes to unit counts (discussed in **Section 1.2**), phasing and road alignment modifications are proposed within the Barrhaven Conservancy East Lands. **Table 1**, compares the phasing considered as part of the 2022 Study to what is being proposed in the revised concept plan. Please refer to the attached concept plans for additional information on phasing boundaries.

Table 1: Phasing Comparison for Barrhaven Conservancy East Lands

2022 Study (2021 concept plan)	2024 Update (2024 concept plan)
Phase 2 – 2A	Phase 2
Phase 2 – 2B	Phases 2 & 4
Phase 2 – 2C	Phase 4
Phase 3 – 2D	Phase 2
Phase 3 – 2E	Phases 2, 3 & 4
Jock River	Jock River Phases 1 to 3
Phase 4	Excluded (now part of Barrhaven Conservancy West Lands)

Reference: Caivan Barrhaven Conservancy East Development

In addition to phasing changes, the proposed road alignment of what is now referred to as Les Emmerson Drive has been adjusted. Within the new Phase 3, stacked townhome (condo) blocks are now proposed in areas where standard townhomes were previously proposed, as depicted in **Figure 1**. This results in modifications to the road alignment, which is now being replaced with parking lots for the condo blocks. As such, the watermain network in that area of the proposed development will need reassessment to confirm that the watermain sizing is appropriate to meet previously established design criteria.

Figure 1: 2021 Concept Plan vs 2024 Concept Plan

1.2 Growth Projection Comparison

The residential population was estimated based on household sizes as per population densities (or persons per unit, PPU) specified in the City's Water Design Guidelines. As part of the 2022 Study, the total number of units for Barrhaven Conservancy East was estimated to be 991 (696 single family homes or SFH, and 295 townhouses or MTL), with a total residential population of 3,163. Note that the units from what was referred to as Phase 4 in the 2022 Study, now excluded from the Barrhaven Conservancy East lands, were not considered in the aforementioned 991 units.

Based on the updated concept plan, the total number of units is estimated to be 1,272 (527 SFH and 745 MTL), with a total residential population of 3,803. **Table 2** shows the new estimated number of units per phase of development, and the projected populations based on the distribution of unit types.

Based on the updated conceptual plan, the number of units increased by 281 compared to what was considered in the 2022 Study for Barrhaven Conservancy East. It is to note that the number of SFH units decreased (-169 units) with the proposed changes to the concept plan, while the number of MTL increased (+450).

Reference: Caivan Barrhaven Conservancy East Development

Table 2: Estimated Unit Counts and Populations Based on Updated Concept Plan

Phase	Sub Phase	Unit Type	Units	PPU	Population
2		Singles	204	3.4	694
		Towns	140	2.7	378
		Phase 2 Sub-Total	***344***	***-***	***1,072***
3		Singles	0	3.4	0
		Towns	204	2.7	551
		Phase 3 Sub-Total	***204***	***-***	***551***
4		Singles	0	3.4	0
		Towns	401	2.7	1,083
		Phase 4 Sub-Total	***401***	***-***	***1,083***
Jock River (JR)	JR1	Singles	105	3.4	357
		Towns	0	2.7	0
	JR2	Singles	151	3.4	513
		Towns	0	2.7	0
	JR3	Singles	67	3.4	228
		Towns	0	2.7	0
	JR Phase Sub-Total		***323***	***-***	***1,098***
Total			***1,272***		***3,803***

1.3 Water Demand Projection Comparison

The City's Water Design Guidelines refer to the MECP Guidelines for consumption rates for buildout population greater than 3,000. The MECP Guidelines provide a consumption rate range of 270 L/cap/day to 450 L/cap/day. The City's Water Design Guidelines consumption rates for subdivisions of 501 to 3,000 persons (i.e., 280 L/cap/day) fall within that range. The demand rates and peaking factors from the Water Design Guidelines and Technical Bulletin ISTB-2021-03 were applied in the 2022 Study, and the same approach was used for this assessment. The average day (AVDY) demands, maximum day (MXDY) demands, and peak hour (PKHR) demands were identified as 10.24 L/s, 25.63 L/s, and 56.38 L/s, respectively, for Barrhaven Conservancy East in the 2022 Study.

The updated buildout population of the proposed development is 3,803, as discussed in **Section 1.2**. The estimated AVDY, MXDY and PKHR demand projections, based on the updated concept plan, are summarized in **Table 3**.

Reference: Caivan Barrhaven Conservancy East Development

Table 3: Estimated Demand Projects Based on Updated Concept Plan

Phase	Sub Phase	Unit Type	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
2		Singles	2.25	5.62	12.36
		Towns	1.23	3.06	6.74
		Phase 2 Sub-Total	***3.47***	***8.68***	***19.10***
3		Singles	0.00	0.00	0.00
		Towns	1.79	4.46	9.82
		Phase 3 Sub-Total	***1.79***	***4.46***	***9.82***
4		Singles	0.00	0.00	0.00
		Towns	3.51	8.77	19.30
		Phase 4 Sub-Total	***3.51***	***8.77***	***19.30***
Jock River (JR)	JR1	Singles	1.16	2.89	6.36
		Towns	0.00	0.00	0.00
	JR2	Singles	1.66	4.16	9.15
		Towns	0.00	0.00	0.00
	JR3	Singles	0.74	1.85	4.06
		Towns	0.00	0.00	0.00
	JR Phase Sub-Total		***3.56***	***8.90***	***19.57***
Total			***12.33***	***30.81***	***67.79***

Based on the revised conceptual plan and associated changes in population, the AVDY, MXDY and PKHR demands increased by 2.08 L/s, 5.19 L/s, and 11.41 L/s, respectively, in comparison to what was established in the 2022 Study. This represents a water demand increase of approximately 20% for the Barrhaven Conservancy East lands. This change is considerable and requires a reassessment of the proposed water distribution network within the Barrhaven Conservancy East Development to confirm that watermain sizing is appropriate to meet the design criteria.

The 2022 Study concluded that minimum pressures under PKHR conditions exceeded 72 psi, significantly surpassing the minimum pressure objective of 50 psi. On the other hand, pressure control measures, such as pressure reducing valves (PRVs), were recommended in areas where maximum pressures exceeded 80 psi under AVDY conditions. The need for such measures will be reevaluated. Despite the increased water demands in the proposed development area, it is anticipated that the area will still be serviceable within the desired pressure range with appropriate watermain sizing.

Additionally, it is important to note that the overall watermain network recommendations are governed by fire flow requirements. As part of the 2022 Study, a required fire flow (RFF) of 217 L/s was considered for the area. The increase in MXDY demands associated with the updated development plan represents approximately 2% of the total flow when factoring in the fire flow under MXDY+FF conditions (i.e., 30.81 L/s + 217.00 L/s = 247.81 L/s). Given these considerations, it is anticipated that the network, appropriately sized, will still meet all design criteria.

However, considering the addition of stacked townhome (condo) units within the development lands, FUS calculations will be reevaluated. This assessment will confirm whether fire mitigation measures are required to align with the previously established RFF.

Lastly, given the changes to water demands, the revised hydraulic analysis requires obtaining updated water boundary conditions from the City. As a result, the revised potable water hydraulic analysis will be completed upon receipt of the revised boundary conditions and a report will be submitted under separate cover.

2 Conclusions

Based on the updated conceptual development plan for the Barrhaven Conservancy East Development, the number of units increased by 281 compared to the 2021 development plan. This results in an estimated population increase of 640. The number of unit changes and resulting population increase result in higher AVDY, MXDY and PKHR demands for the development compared to the values assessed in the 2022 study.

A water demand increase of approximately 20% was observed, which requires a reassessment of the proposed water distribution network within the Barrhaven Conservancy East Development to confirm that watermain sizing and pressure ranges. Furthermore, updated FUS calculations are needed to confirm whether fire mitigation measures are required to meet the previously established RFF, given the inclusion of stacked townhouse (condo) units in the updated site plan.

Considering the previously established hydraulic conditions (2022 Study), it is anticipated that the area would still be serviced within the desired pressure range and meet all design criteria. To validate this, a revised potable water hydraulic analysis will be conducted, specifically focusing on confirming the watermain sizing within the proposed development lands.

Given the changes to water demands, the revised hydraulic analysis requires obtaining updated water boundary conditions from the City. As a result, the revised potable water hydraulic analysis will be completed upon receipt of the revised boundary conditions and a report will be submitted under separate cover.

This memo serves as a preliminary summary of initial observations in support of DSEL's update to the Design Brief for Phases 3 and 4 of the Barrhaven Conservancy East Development.

Regards,

STANTEC CONSULTING LTD.

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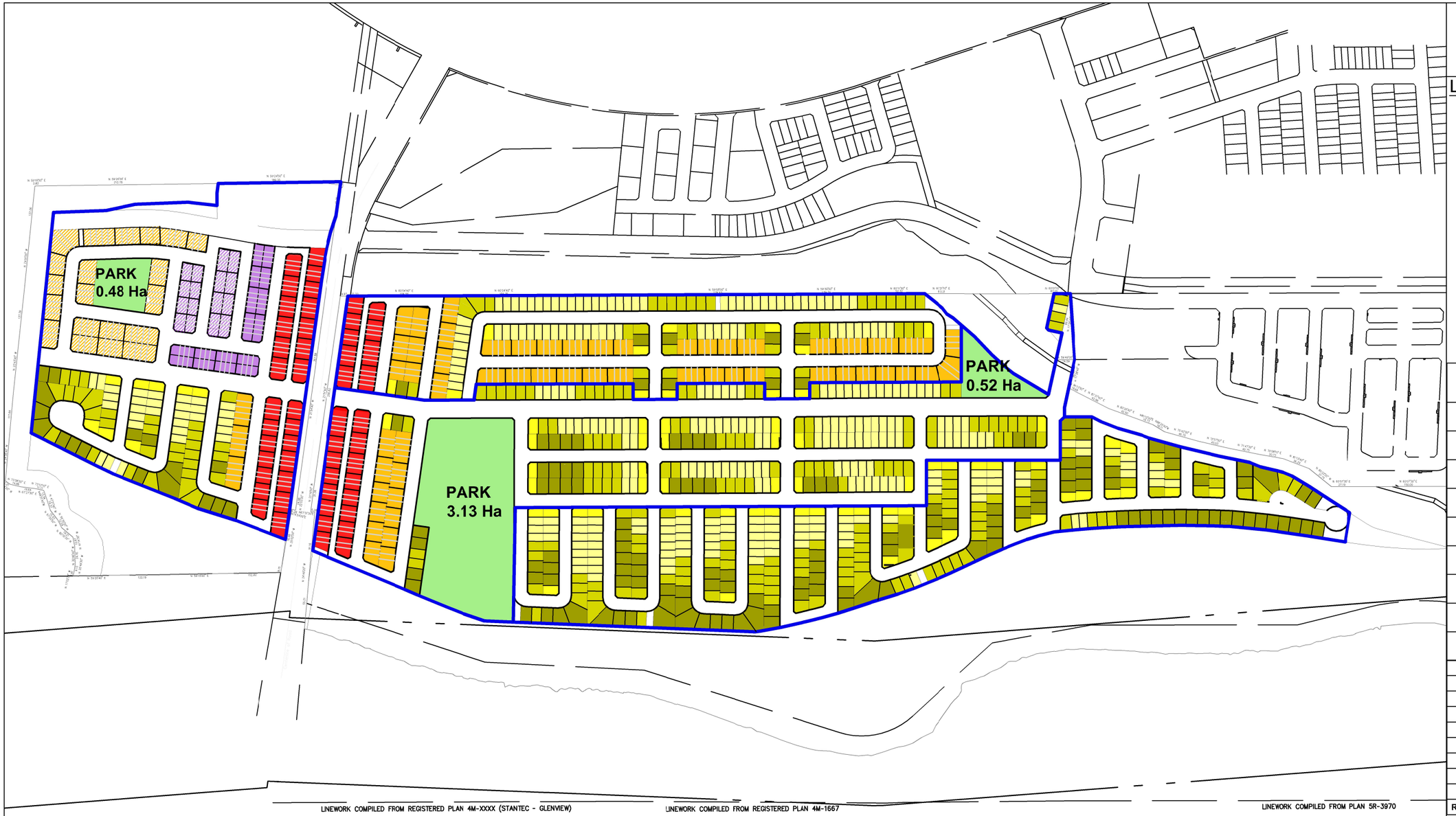
Attachments: 1 – Original Site Plan (2021)
2 – Updated Site Plan (2024)



CAIVAN

LEGEND:

- RLTH
- STANDARD TOWNHOUSE
- B2B
- 35' DETACHED HOME
- 41' DETACHED HOME
- 42' DETACHED HOME
- 50' DETACHED HOME
- OVER DEPTH TOWNHOUSE
- OVER DEPTH B2B
- PHASE LINE

BCDC TOTAL LOT UNIT COUNT		
	TOTAL	%
RLTH	183	17
B2B	124	12
STND TH	288	27
35' SINGLE	218	21
41' SINGLE	39	4
42' SINGLE	145	14
50' SINGLE	56	5
TOTAL	1053	100

REV#	DESCRIPTION	DATE
09	Revised servicingblocks to 9m	21/10/13
08	Revised 40' labeI n tables to 41'	21/09/20
07	Revised B2B due :o high plasticity soils.	21/09/17
06	Revised B2B due :o high plasticity soils.	21/09/16
05	Added singles blo:k on 24m ROW	21/09/15
04	Revised B2B confguration	21/09/15
03	Added B2B - Appox. 120 units	21/09/14
02	Revised lot mix m>re singles in PH3 & TH in PH2	21/09/14
01	Revised lot mix ard removed 50's in PH3	21/09/09

DATE: 21/10/13

PROJECT NO.: OTL400.2

PROJECT NAME: CONSERVANCY EAST

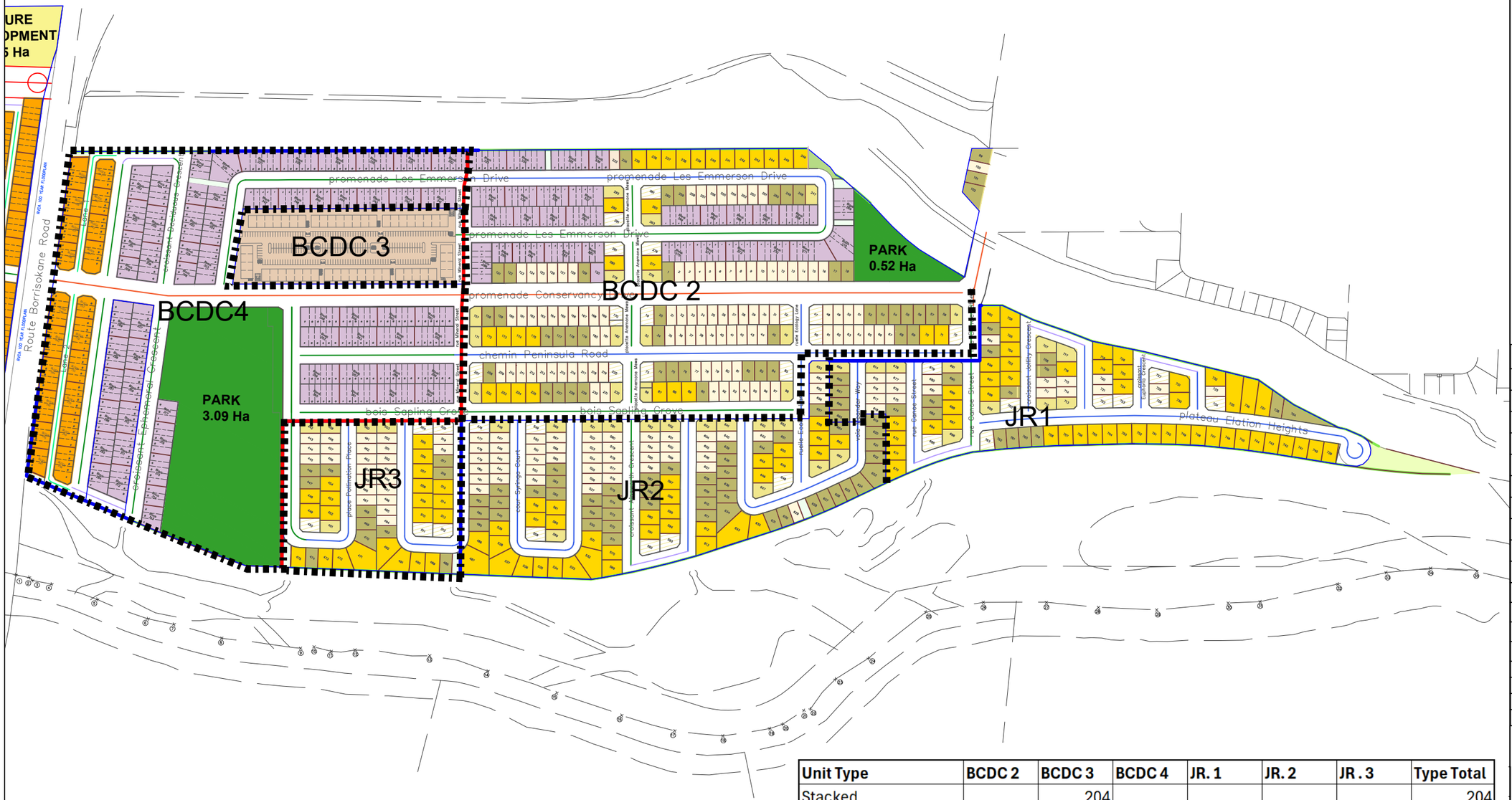
DRAWING #: SK-02.8

PH 2 LOT UNIT COUNT		
	TOTAL	%
RLTH	53	16
B2B	0	0
STND TH	41	12
35' SINGLE	113	34
41' SINGLE	19	6
42' SINGLE	78	23
50' SINGLE	30	9
TOTAL	334	100

PH 3 LOT UNIT COUNT		
	TOTAL	%
RLTH	34	11
B2B	0	0
STND TH	156	49
35' SINGLE	75	23
41' SINGLE	12	3
42' SINGLE	36	11
50' SINGLE	9	3
TOTAL	322	100

PH 4 LOT UNIT COUNT		
	TOTAL	%
RLTH	96	24
B2B	124	31
STND TH	91	23
35' SINGLE	30	8
41' SINGLE	8	2
42' SINGLE	31	8
50' SINGLE	17	4
TOTAL	397	100

JOCK RIVER LOT UNIT COUNT		
	TOTAL	%
RLTH	0	0
B2B	0	0
STND TH	0	0
35' SINGLE	93	28
41' SINGLE	33	10
42' SINGLE	98	30
50' SINGLE	104	32
TOTAL	328	100



East of Mineral (1/300)	2.2233	ha
West of Mineral (1/600)	1.0083	ha
Total Required	3.2317	ha
Total Parkland in Provided BCDC E	3.6100	ha
Total Overdedication in BCDC East	0.3783	ha

Unit Type	BCDC 2	BCDC 3	BCDC 4	JR. 1	JR. 2	JR . 3	Type Total
Stacked		204					204
RLT			87				87
19.6' TH	140		314				454
35' Single	100			18	47	24	189
41' Regular	16			10	15	5	46
41' Oversize	13			9	6	5	33
42' Single	46			19	48	11	124
50' Single	29			49	35	22	135
Sub-Total	344	204	401	105	151	67	1272
Total	1272						

CAIVAN

LEGEND:

- RLTH (18.9m DEPTH)
- 19.6' STANDARD TOWNHOUSE
- 35' DETACHED HOME
- 41' DETACHED HOME (REGULAR)
- 41' DETACHED HOME (OVERSIZED)
- 42' DETACHED HOME
- 50' DETACHED HOME
- STACKED CONDO BLOCK
- PARKS
- WALKWAY/SERVICING BLOCK
- PHASE BOUNDARY
- BCDCE DRAFT PLAN DEVISING LINE

- 24m ROW
- 18m ROW
- 16.5m ROW
- 14/14.75m ROW
- 8.5m ROW

BCDCE LOT COUNT	
UNIT TYPE	# UNITS
STACKED	204
18.9m RLTH	87
19.6' TH	454
35' SINGLE	189
41' REGULAR	52
41' OVERSIZED	33
42' SINGLE	118
50' SINGLE	135
Total	1272

REV#	DESCRIPTION	DATE
15	Unit count recount, tables updated to reflect	24-03-07
14	revisions made on sk-8.2 now sk-8.3	24-02-21
13	SK8.2 NEW UNIT COUNT REOPTIMIZED BANKS	24/02/21
12	Revised Les Emmerson, removed TH block for singles	24/02/13
11	Updated STND TH to new 19.6' TH	24/01/18
10	Updated Plan and Phasing and unit counts	24/01/11
09	Revised BCDC 4 from Stacks to 19' THs	23/12/15

DATE: 2024-03-07

DRAWN BY: LV

PROJECT NO.: OTL400.2

PROJECT NAME: CONSERVANCY EAST

DRAWING #: SK-08.3