NOVEMBER 22, 2024

PROJECT NO: 624-6777

SENT VIA: EMAIL

TOWN OF CALEDON
PLANNING
RECEIVED

Dec 17, 2024

Toronto and Region Conservation Authority
101 Exchange Avenue
Vaughan, ON L4K 5R6

Attention: Michael Hynes, MES, MCIP, RPP
Senior Planner, Development Planning and Permits

RE: PROLOGIS HUMBER STATION – TEMPORARY STORMWATER MANAGEMENT OUTLET

Dear Michael,

As discussed in our meeting on Friday, September 6th, 2024, C.F. Crozier & Associates Inc. (Crozier) was retained by Prologis to prepare a detailed stormwater management design to support the Site Plan Application for a proposed industrial development located at 12519-12713 Humber Station Road in the Town of Caledon. The property is located within the Humber Station Villages Employment Area, Lots 1-5, Concession 5 (Albion) in the Town of Caledon. A Comprehensive Environmental Impact Study and Management Plan (CEISMP) for Phase 1 dated July 2024 and Phase 2 dated November 2024 were prepared by Schaeffers to support the development of Humber Station Villages. The management plan includes roads, storm sewers and a pond downstream of the Prologis property which will ultimately serve as the outlet for the development. As the parcel (12285 Humber Station Road) north of the SWM Block is a non-participating landowner, it is unclear when the proposed road and storm sewer will be designed and constructed.

This letter has been prepared to support a temporary outlet to the Clarkway Tributary for the first phase of the Prologis development which would remain in place until the downstream storm sewers and stormwater management pond proposed in the CEISMP are constructed. The terms of reference for this analysis were confirmed through email correspondence between Crozier and the TRCA dated September 19, 2024. A copy of this email is attached for reference.

The first phase of the Prologis development (Phase 1A) occupies approximately 27.6 ha in the northeast of the site. Refer to the Master Site Plan (Petroff, November 14, 2024) and Drawing C200 for the General Servicing Plan illustrating the proposed development. Most of Phase 1A drains to the existing HDF 8 just south of the property. This feature is not a suitable outlet for the development as it is not a defined drainage feature. Based on the concept plan layout, we would like to propose an outlet towards the Clarkway Tributary, at the southeast corner of the property. We have completed the following analysis to support the flow diversion and interim outlet location based on correspondence with the TRCA.

1. *The initial step is to calculate the required site release rates for the portion of the subject properties that drains to the Clarkway Tributary under existing conditions and determine the storage requirements for the stormwater management (SWM) pond accordingly using the criterion.*

The Humber River unitary flow rates for Sub-basin 36 were used to determine the allowable release rates to the Clarkway Tributary for the property. The 9.56 ha area along the northeast property line that drains to the Clarkway Tributary in existing conditions was used for this calculation. The TRCA Humber catchments were used to delineate this area as shown in **Figure 1**.

The storage required to control Phase 1A to the unitary release rates was determined using VO and the TRCA 12-hour AES storm events since it produced the highest peak flows and storage values in the Phase 1A model. The 100-year release rate was calculated to be 0.236 m^3/s. To control Phase 1A to this release rate, a storage of 18,385 m^3 is required for the 100-year event and a storage of 43,358 m^3 is required for the Regional event. Refer to **Figure 2** for the post-development drainage area plan and **Table 1** below for calculated release rates and required storage. Detailed model parameters are provided as an attachment to this letter, as is a copy of the VO model.

Table 1: Release Rates and Storage

Return Period	Calculated Unit Flow Rate		Required Storage
	L/s	(m^3/s)	m^3
2-Year	75.4	0.075	8,898
5-Year	115.6	0.116	11,525
10-Year	142.0	0.142	13,156
25-Year	178.9	0.179	15,308
50-Year	209.0	0.209	16,838
100-Year	236.0	0.236	18,385
Regional	678.8	0.679	43,358

2. *Identify and describe the constraint that makes the above requirement challenging, and propose an approach to resolve the issue without negatively affecting the receiving feature (flooding and erosion).*

In order to control the Phase 1A area to the relatively small target release rates for the Clarkway Tributary as described above, a significant amount of storage is required for the interim outlet conditions. There is insufficient space available within the property to provide a SWM facility large enough to contain this quantity of storage. Therefore, a sensitivity analysis has been completed using the TRCA Humber VO model to determine the maximum discharge from Phase 1A that does not impact the conditions downstream of the property. Further details on the analysis are provided below.

3. *Identify contributing drainage area to the proposed interim outlet location in Clarkway Tributary and summarize in a drainage map.*
    a. *Compare the upstream area and diversion area.*

Figure 2 attached shows the post-development catchment areas from Phase 1A that are to drain to the interim outlet location. It also shows the proposed SWM facility. **Figure 3** shows the upstream area contributing to the tributary and highlights the areas within Phase 1A that are proposed to be diverted. The diverted areas are summarized in the table below. As shown, the 13.93 ha diverted area is very minor in comparison to the total 651.6 ha contributing area, representing 2.14% of the total area.

Table 2: Diverted Area Summary

TRCA VO Catchment	Drainage Feature	Diverted Area (ha)	Total Upstream Area (ha)	Diverted Area Percentage (%)
43.03	HDF-8	13.93	651.60	2.14

b. *Compare the modeled flows from the diversion area to the modeled flows in the Clarkway Tributary.*

The unitary release rate for Phase 1A has been calculated as described in Comment 1 above. The table below compares the Phase 1A peak flow with the total peak flow at the Phase 1A outlet location (J124) for the 2 to 100-year storm events. The target release rate has been area weighted for the diverted area. As shown in the table below, the 100-year release rate for the diverted area represents approximately 0.2% of the total peak flow within the Clarkway Tributary at the Phase 1A outlet location and the Regional represents 0.43%.

Table 3: Peak Flow Comparison

Storm Event	Phase 1A Release Rate (m^3/s)	Area Weighted Peak Flow for Diverted Area (m^3/s)	J124 Peak Flow (m^3/s)	Diverted Area / J124 Peak Flow Percentage (%)
2 Yr 6 Hour AES	0.075	0.025	10.489	0.24
5 Yr 6 Hour AES	0.116	0.039	16.855	0.23
10 Yr 6 Hour AES	0.142	0.048	21.382	0.22
25 Yr 6 Hour AES	0.179	0.060	28.307	0.21
50 Yr 6 Hour AES	0.209	0.070	33.397	0.21
100 Yr 6 Hour AES	0.236	0.079	39.218	0.20
Regional	0.679	0.332	77.841	0.43

4. *Conduct flow comparison and sensitivity analysis in the VO model regarding flow diversion for the Clarkway Tributary.*
   a. *Review and assess the downstream impact assuming the flow change and no SWM controls.*
      i. *Assess the flow change within the Clarkway Tributary at the proposed interim outlet location.*

A sensitivity analysis was completed by adding the Phase 1A post-development catchments into the TRCA Humber VO model and adjusting the existing catchments accordingly. The Phase 1A catchments were routed to the Clarkway Tributary outlet location without storage so the impacts on the downstream system could be analyzed. The 6-hour AES storm was used for this analysis as it produces the highest peak flows in the TRCA Humber VO model. The table below summarizes the results at the outlet location (J124) and two other locations farther downstream (J4200.683 and J1700.594). Detailed results are attached for reference.

Table 4: Peak Flow Release Rates without Storage

Storm Event	Junction	Pre-dev Peak Flow Rate (m^3/s)	Post-dev Peak Flow Rate (m^3/s)	Percent Increase (%)
2 Yr 6 Hr AES	J124	10.489	10.531	0.4
	J4200.683	10.618	10.651	0.3
	J1700.594	10.510	10.589	0.8
5 Yr 6 Hr AES	J124	16.855	16.891	0.2
	J4200.683	17.191	17.253	0.4
	J1700.594	16.180	16.289	0.7
10 Yr 6 Hr AES	J124	21.382	21.385	0.0
	J4200.683	21.659	21.767	0.5
	J1700.594	20.046	20.214	0.8
25 Yr 6 Hr AES	J124	23.307	28.374	0.2
	J4200.683	27.434	27.711	1.0
	J1700.594	25.359	25.563	0.8
50 Yr 6 Hr AES	J124	33.397	33.503	0.3
	J4200.683	33.683	33.913	0.7
	J1700.594	29.487	29.736	0.8
100 Yr 6 Hr	J124	39.218	39.106	-0.3
	J4200.683	39.415	39.739	0.8
	J1700.594	34.201	34.558	1.0
Hazel	J124	76.143	77.841	2.2
	J4200.683	90.288	92.357	2.3
	J1700.594	110.616	112.683	1.9

ii. *Assess the flow change within the Clarkway Tributary downstream of the proposed outlet to the confluence at node 43.2 (downstream of Mayfield Road).*

Node 43.2 is located at J124 within the VO model. See results for J124 presented in the table above.

b. *Complete sensitivity analysis for the following:*

i. *Required Site release rate calculated based on unitary release rate calculated using the existing drainage area to the Clarkway Tributary.*

A sensitivity analysis was completed by adding the Phase 1A post-development catchments into the TRCA Humber VO model and adjusting the existing catchments accordingly. The Phase 1A catchments were routed to a reservoir so the Phase 1A peak flow discharging to the Clarkway Tributary could be iterated and the impacts on the downstream system could be analyzed. The first scenario included setting the Phase 1A discharge according to the unitary flow rate calculations. Then, the peak flow was increased and the impacts on the peak flows were analyzed.

The modeling shows that if the unitary release rate for the 2-to-100-year storm events is multiplied by 4, the impacts to downstream peak flows are negligible. The 6-hour AES storm events were used for the analysis. Similarly, if the regional release rate is multiplied by 2.5, the impacts to downstream peak flows are negligible. The table below summarize the results.

Table 5: Peak Flow Release Rates with Storage

Storm Event	Phase 1A Release Rate (m^3/s)	Phase 1A Storage (m^3)	Junction	Pre-dev Peak Flow Rate (m^3/s)	Post-dev Peak Flow Rate (m^3/s)	Percent Increase (%)
2 Yr	0.300	0.705	J124	10.489	10.450	-0.4
			J4200.683	10.618	10.641	0.2
			J1700.594	10.510	10.556	0.4
5 Yr	0.464	0.921	J124	16.855	16.823	-0.2
			J4200.683	17.191	17.223	0.2
			J1700.594	16.180	16.227	0.3
10 Yr	0.568	1.071	J124	21.382	21.314	-0.3
			J4200.683	21.659	21.714	0.3
			J1700.594	20.046	20.120	0.4
25 Yr	0.716	1.248	J124	23.307	27.877	-1.5
			J4200.683	27.434	27.523	0.3
			J1700.594	25.359	25.465	0.4
50 Yr	0.836	1.387	J124	33.397	33.293	-0.3
			J4200.683	33.683	33.573	-0.3
			J1700.594	29.487	29.603	0.4
100 Yr	0.944	1.513	J124	39.218	39.105	-0.3
			J4200.683	39.415	39.403	0.0
			J1700.594	34.201	34.305	0.3
Hazel	1.697	3.362	J124	76.143	76.101	-0.1
			J4200.683	90.288	90.246	0.0
			J1700.594	110.616	110.594	0.0

ii. Unit flow rates calculated using the area for the existing areas draining to Clarkway Tributary and the area to be diverted from HDF 8.

The unitary flow rates based on the existing areas draining to the Clarkway Tributary per the CEISMP report, are summarized in the table below.

Table 6: Unitary Release Rates

Return Period	Calculated Unit Flow Rate	
	L/s	(m^3/s)
2-Year	192.3	0.192
5-Year	292.9	0.293
10-Year	361.4	0.361
25-Year	454.3	0.454
50-Year	528.4	0.528
100-Year	598.4	0.598
Regional	3,362	3.362

A scenario was created and run in the TRCA Humber VO model with Phase 1A discharging these peak flows to the Clarkway Tributary and the downstream nodes were analyzed. The results are summarized in the table below.

Table 7: Peak Flow Analysis Summary

Storm Event	Junction	Pre-dev Peak Flow Rate (m^3/s)	Post-dev Peak Flow Rate (m^3/s)	Percent Increase (%)
2 Yr	J124	10.489	10.311	-1.7
	J4200.683	10.618	10.505	-1.1
	J1700.594	10.510	10.448	-0.6
5 Yr	J124	16.855	16.592	-1.6
	J4200.683	17.191	16.998	-1.1
	J1700.594	16.180	16.075	-0.6
10 Yr	J124	21.382	21.053	-1.5
	J4200.683	21.659	21.444	-1.0
	J1700.594	20.046	19.912	-0.7
25 Yr	J124	23.307	27.588	-2.5
	J4200.683	27.434	27.202	-0.8
	J1700.594	25.359	25.218	-0.6
50 Yr	J124	33.397	32.952	-1.3
	J4200.683	33.683	33.253	-1.3
	J1700.594	29.487	29.305	-0.6
100 Yr	J124	39.218	38.707	-1.3
	J4200.683	39.415	39.008	-1.0
	J1700.594	34.201	33.911	-0.8
Hazel	J124	76.143	75.769	-0.5
	J4200.683	90.288	89.917	-0.4
	J1700.594	110.616	110.332	-0.3

Please note, the detailed Phase 1A model that was used for this analysis has been revised since the initial analysis described in 4a above was completed. Therefore, there are slight discrepancies in the VO model parameter inputs, but the conclusions remain the same. Please refer to the Stormwater Management Implementation Report prepared by Crozier for further information regarding the detailed design VO model parameters.

iii. *Proposed Site release rate to Clarkway Tributary (rate calculated in bullet ii reduced by the percentage required to produce no significant downstream impacts.*

As discussed in Comment 4b above, multiplying the unitary release rates for the Phase 1A by 4 for the 2- to 100-year and 2.5 for the Regional storm event has a negligible impact on the downstream system and requires the smallest amount of additional site storage. These release rates are higher than those required for the ultimate conditions for the 2 through 100 year storm events. As the Prologis development needs to be designed to meet the release rates identified in the CEISMP, the storage and controls for the 2-100 year storms are provided within the Phase 1A development area. These release rates are shown in green in the table below. The release rate calculated for the regional storm is smaller under interim conditions than the release rate for the ultimate conditions, so additional storage will be required.

Therefore, we are proposing the following release rates, shown in green, for Phase 1A to the temporary outlet.

Table 8: Proposed Phase 1A Release Rates

Storm Event	Phase 1A Release Rate (m^3/s)		Storage Required (m^3)	
	Interim	Phase 1A	Phase 1A	Interim Pond
2 Yr	0.300	1920	0.705	6516
5 Yr	0.464	2930	0.921	8077
10 yr	0.568	3610	1.071	8822
25 Yr	0.716	4540	1.248	9774
50 Yr	0.836	5280	1.387	10193
100 Yr	0.944	5980	1.513	10636
Regional	**1.697**	22270	**3.362**	16540

5. *Conduct hydraulic downstream impact assessment.*
    a. *Update the HEC-RAS model with the updated flow from task #2.*
    b. *Evaluate the impact on water surface elevations and velocity between the proposed interim outlet location and node 43.2 (Mayfield Road).*

The sensitivity analysis shows that if the release rates from 4 ii. are used as described above, there are no increases in downstream peak flows. The node directly downstream (J124) has a percent decrease of -0.8% for the 100-year storm event. Since there are no increases in peak flows, the downstream watercourse will not be impacted and no changes to the HEC-RAS model are required.

1. *Erosion Assessment*
    a. *Fluvial engineer to review the erosion impact at the outlet location and points of interest downstream of the Site.*
    b. *Since diverting areas will lead to a significant increase in runoff volume, which may cause instream erosion, it is crucial that the stormwater management (SWM) strategy includes a minimum of 10mm of onsite runoff retention, which can be managed through infiltration or evapotranspiration.*
    c. *48-hour drawdown time is required for the SWM pond.*

A minimum of 10 mm of onsite retention has been accounted for in the design and 48 hours of extended detention will be provided by the interim pond. Please refer to the Stormwater Management Implementation Report prepared by Crozier under a separate cover for further details regarding erosion and water balance.

2. *Water balance*
    a. *Site specific water balance should be maintained, matching post-development infiltration volume to pre-development.*
    b. *Fill loading impact on soil infiltration, mounding and LID infiltration rates should be reviewed by a geotechnical and hydrogeological engineer.*

Comment 2 is addressed in the Stormwater Management Implementation Report prepared by Crozier under a separate cover. Please refer to this report for further details regarding water balance.

The analysis and responses described in responses to comments 1 to 5 above demonstrate that Phase 1A of the development can discharge to the Clarkway Tributary without negatively impacting the conditions downstream. Therefore, we believe that using the Clarkway Tributary as a temporary outlet during interim conditions is the best solution.

Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

M. Findlay

Maggie Findlay, EIT
Land Development

C.F. CROZIER & ASSOCIATES INC.

Rebecca Archer, P.Eng.
Senior Project Engineer

LICENSED PROFESSIONAL ENGINEER
Nov. 22, 2024
R.S. ARCHER
100120701
PROVINCE OF ONTARIO

MF/tc

c.c.

Enclosure Email correspondence
Hydrologic Input Parameters
Unitary Release Rate Calculations
Diverted Area Summary
VO Model Sensitivity Analysis Output Tables
Figure 1 - Interim Conditions Target Release Rate
Figure 2 - Interim Conditions Drainage Figure
Figure 3 - Interim Conditions Diverted Drainage Areas

\\Crozier-Files\Projects\600\624 - Prologis\6777 - Prologis Humber Station - Phase 1 & 2\Letters\2024.11.22_TRCA Letter\6777_Humber Station TRCA Letter.docx

From: Michael Hynes <Michael.Hynes@trca.ca>
Sent: Thursday, September 19, 2024 12:28 PM
To: Hamdy Shafi <hshafi@cfcrozier.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>
Cc: Heaven Lin <hlin@cfcrozier.ca>; Rebecca Archer <rarcher@cfcrozier.ca>; Mena Iskander <miskander@cfcrozier.ca>; Canejo, Carlos <ccanejo@prologis.com>; Joe Plutino <jplutino@mainlineplanning.com>; Jim Davidson <Jdavidson@mainlineplanning.com>; Adam Miller <Adam.Miller@trca.ca>; Jason Wagler <Jason.Wagler@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>; Ali Shirazi <Ali.Shirazi@trca.ca>
Subject: RE: Prologis Humber Station - SWM Outlet Discussion with TRCA

Good Afternoon,

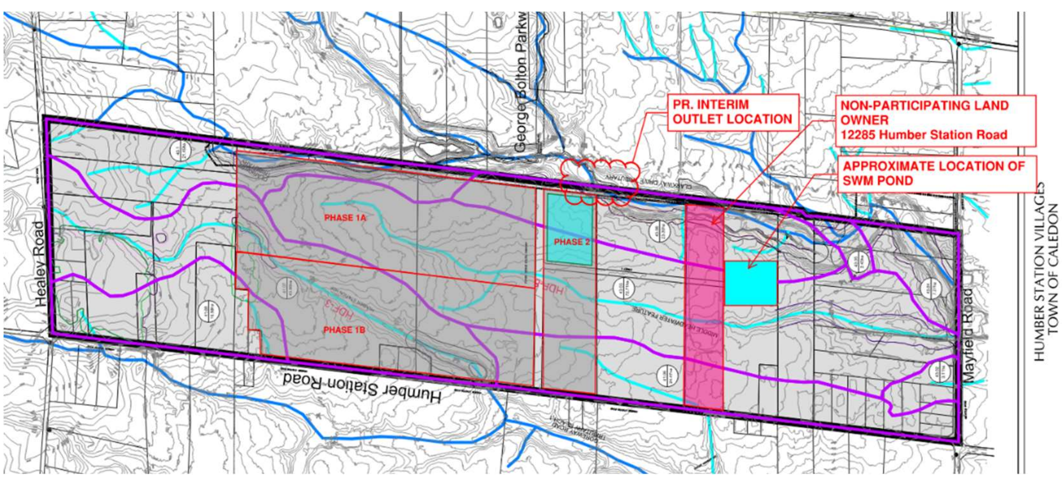
Technical staff have reviewed your Prologis Humber Station - SWM Outlet Discussion with TRCA and would provide the following changes in red below. Sorry for the delay in responding. Should you have questions please contact me.

Good Morning Michael,

Thank you for meeting with us on Friday, September 6, 2024. As discussed, please see the meeting summary below and our inquiries regarding the SWM outlet.

We have completed a submission dated April 2024 for the Draft Plan of Subdivision, Zoning Bylaw Amendment, and Site Plan Application following CEISMP Phase 1. Due to the delay in the CEISMP Phase 2 submission, the Town has not started their review, or circulated documents to agencies for formal review. Please see attached the Site Plan for context of the proposed development (Phase 1 of the Prologis Humber Station Distribution Centre).

Following the design concept of CEISMP Phase 1 and 2, an end-of-pipe SWM facility is proposed to provide water quantity and quality control for the Humber Station Employment area. As the parcel (12285 Humber Station Road) north of the SWM Block is a non-participating landowner, it is unclear when the proposed road and storm sewer will be designed and constructed. This may delay the Prologis Humber Station construction schedule. Therefore, we would like to explore the SWM outlet location as an interim solution.



The Site is draining to the existing HDF 8 just south of the Site. This feature is not a suitable outlet for the development as it is not a defined drainage feature. Based on the concept plan layout, we would like to propose an outlet towards the Clarkway Tributary, at the southeast corner of the Site. Based on the meeting discussion we will provide the following analysis to support the flow diversion and interim outlet location:

1. The initial step is to calculate the required site release rates for the portion of the subject properties that drains to the Clarkway Tributary under existing conditions and determine the storage requirements fo the stormwater management (SWM) pond accordingly using the criterion.
2. Identify and describe the constraint that makes the above requirement challenging, and propose an approach to resolve the issue without negatively affecting the receiving feature (flooding and erosion).
3. Identify contributing drainage area to the proposed interim outlet location in Clarkway Tributary and summarize in a drainage map.
    a. Compare the upstream area and diversion area.
    b. Compare the modeled flows from the diversion area to the modeled flows in the Clarkway Tributary.
4. Conduct flow comparison and sensitivity analysis in the VO model regarding flow diversion for the Clarkway Tributary.
    a. Review and assess the downstream impact assuming the flow change and no SWM controls.
        i. Assess the flow change within the Clarkway Tributary at the proposed interim outlet location.
        ii. Assess the flow change within the Clarkway Tributary downstream of the proposed outlet to the confluence at node 43.2 (downstream of Mayfield Road).
    b. Complete sensitivity analysis for the following:
        i. Required Site release rate calculated based on unitary release rate calculated using the existing drainage area to the Clarkway Tributary.
        ii. Unit flow rates calculated using the area for the existing areas draining to Clarkway Tributary and the area to be diverted from HDF 8.
        iii. Proposed Site release rate to Clarkway Tributary (rate calculated in bullet ii reduced by the percentage required to produce no significant downstream impacts.
5. Conduct hydraulic downstream impact assessment.
    a. Update the HEC-RAS model with the updated flow from task #2.
    b. Evaluate the impact on water surface elevations and velocity between the proposed interim outlet location and node 43.2 (Mayfield Road).

The above tasks (1, 2, and 3) will be summarized in a memorandum for TRCA's review. Additional topics such as erosion and water balance criteria were also discussed in the meeting, and these criteria will be incorporated into the submission for Draft Plan of Subdivision, Zoning Bylaw Amendment, and Site Plan Application.

1. Erosion Assessment

a. Fluvial engineer to review the erosion impact at the outlet location and points of interest downstream of the Site.

b. Since diverting areas will lead to a significant increase in runoff volume, which may cause instream erosion, it is crucial that the stormwater management (SWM) strategy includes a minimum of 10mm of onsite runoff retention, which can be managed through infiltration or evapotranspiration.

c. 48-hour drawdown time is required for the SWM pond.

2. Water balance

a. Site specific water balance should be maintained, matching post-development infiltration volume to pre-development.

b. Fill loading impact on soil infiltration, mounding and LID infiltration rates should be reviewed by a geotechnical and hydrogeological engineer.

Please advise if our understanding of the above is correct. We look forward to providing more information to begin the TRCA's preliminary review and advancement of the Prologis Humber Station site design.

Thanks,
Hamdy

Michael Hynes, MES, MCIP, RPP
Senior Planner
Development Planning and Permits | Development and Engineering Services

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Toronto and Region Conservation Authority

From: Hamdy Shafi <hshafi@cfcrozier.ca>
Sent: September 18, 2024 10:26 AM
To: Michael Hynes <Michael.Hynes@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>
Cc: Heaven Lin <hlin@cfcrozier.ca>; Rebecca Archer <rarcher@cfcrozier.ca>; Mena Iskander <miskander@cfcrozier.ca>; Canejo, Carlos <ccanejo@prologis.com>; Joe Plutino <jplutino@mainlineplanning.com>; Jim Davidson <Jdavidson@mainlineplanning.com>
Subject: RE: Prologis Humber Station - SWM Outlet Discussion with TRCA

EXTERNAL SENDER
Good Morning Michael,

Hope all is well.

I just wanted to follow up on my email from last week. Hoping to get your feedback on the framework we have outlined below to confirm we have the correct understanding before getting into our work.

Thanks in advance for your assistance.

Regards,
Hamdy

Hamdy Shafi, P.Eng.
Manager, Land Development
Office: 416.842.0022
Collingwood | Milton | Toronto | Bradford | Guelph

We've elevated our leadership team – click to learn more.

From: Hamdy Shafi <hshafi@cfcrozier.ca>
Sent: Thursday, September 12, 2024 10:35 AM
To: Michael.hynes@trca.ca; Dilnesaw A. DAC. Chekol <dchekol@trca.on.ca>
Cc: Heaven Lin <hlin@cfcrozier.ca>; Rebecca Archer <rarcher@cfcrozier.ca>; Mena Iskander <miskander@cfcrozier.ca>; Canejo, Carlos <ccanejo@prologis.com>; Joe Plutino <jplutino@mainlineplanning.com>; Jim Davidson <Jdavidson@mainlineplanning.com>
Subject: Prologis Humber Station - SWM Outlet Discussion with TRCA

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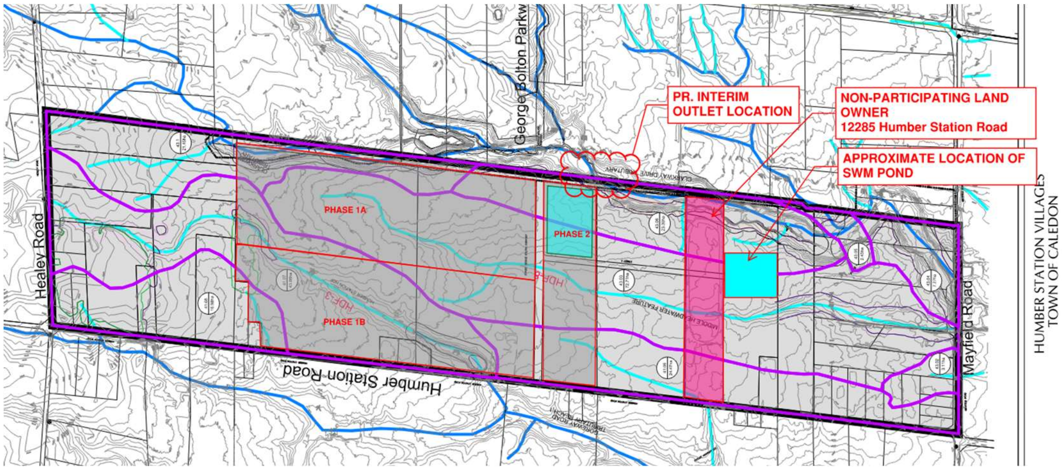

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        i. Required Site release rate calculated based on unitary release rate calculated using the existing drainage area to the Clarkway Tributary.
        ii. Unit flow rates calculated using the area for the existing areas draining to Clarkway Tributary and the area to be diverted from HDF 8.
        iii. Proposed Site release rate to Clarkway Tributary (rate calculated in bullet ii reduced by the percentage required to produce no significant downstream impacts.

3. Conduct hydraulic downstream impact assessment.
    a. Update the HEC-RAS model with the updated flow from task #2.
    b. Evaluate the impact on water surface elevations and velocity between the proposed interim outlet location and node 43.2 (Mayfield Road).

The above tasks (1, 2, and 3) will be summarized in a memorandum for TRCA's review. Additional topics such as erosion and water balance criteria were also discussed in the meeting, and these criteria will be incorporated into the submission for Draft Plan of Subdivision, Zoning Bylaw Amendment, and Site Plan Application.

1. Erosion Assessment
    a. Fluvial engineer to review the erosion impact at the outlet location and points of interest downstream of the Site.

   b. We will explore opportunities to increase onsite retention, such as 10 mm on-site retention will be provided on the roof and removed through evapotranspiration.
   c. 48-hour drawdown time is required for the SWM pond.

2. Water balance
   a. Site specific water balance should be maintained, matching post-development infiltration volume to pre-development.
   b. Fill loading impact on soil infiltration, mounding and LID infiltration rates should be reviewed by a geotechnical and hydrogeological engineer.

Please advise if our understanding of the above is correct. We look forward to providing more information to begin the TRCA's preliminary review and advancement of the Prologis Humber Station site design.

Thanks,
Hamdy

Hamdy Shafi, P.Eng.
Manager, Land Development
Office: 416.842.0022
Collingwood | Milton | Toronto | Bradford | Guelph

Project Name:	Prologis Humber Station	**By:**	MJ	**Catchment Name:**	UC01
Project Number:	624-6777	**Checked by:**	RA	**Catchment Area (ha):**	1.44
Date:	2024.04.11				

Hydrologic Parameters: NASHYD Command
Pre-Development Drainage Area: Catchment UC01

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.44
Total Area Check				1.44

Impervious Landuses Present:											
	Roadway		Sidewalk		Gravel Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	0.00	89			0.00						0.00

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									1.44	74	1.44

CN Calculations		
	Total Area	1.44
	Composite Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	1.44	0.25	0.25
Impervious	0.00	0.90	0.00
Total Subcatchment	**1.4**	**-**	**0.25**

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	1.4
Impervious	1	0.00
Total	5.0	1.4

Time to Peak Calculations

Time to Peak Inputs					Uplands			Bransby Williams		Airport	
Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
335	7.34	2.19%	2.3	0.34	0.27	0.16	0.16	0.26	0.18	0.65	0.44

Appropriate calculated time to peak:	0.44	Appropriate Method:	Airport

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Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: UC02
Catchment Area (ha): 0.98

Hydrologic Parameters: NASHYD Command
Pre-Development Drainage Area: Catchment UC02

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.0
Total Area Check				1.0

Impervious Landuses Present:											
	Roadway		Sidewalk		Gravel Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	0.00	89			0.00						0.00
Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.98	74	0.98

CN Calculations		
	Total Area	0.98
	Composite Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.98	0.25	0.25
Impervious	0.00	0.90	0.00
Total Subcatchment	**1.0**	**-**	**0.25**

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	1.0
Impervious	1	0.00
Total	5.0	1.0

Time to Peak Calculations

Time to Peak Inputs					Uplands			Bransby Williams		Airport	
Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
68	2.6	3.82%	2.3	0.45	0.04	0.03	0.03	0.05	0.03	0.24	0.16

Appropriate calculated time to peak:	0.16	Appropriate Method:	Airport

Minimum Tp = 0.17hr or 10 minutes is used in VO model

Project Name: Prologis Humber Station	**By:** MJ	**Catchment Name:**	UC03
Project Number: 624-6777	**Checked by:** RA	**Catchment Area (ha):**	0.45
Date: 2024.04.11			

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Hydrologic Parameters: NASHYD Command
Pre-Development Drainage Area: Catchment UC03

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	0.5
Total Area Check				0.5

Impervious Landuses Present:											
	Roadway		Sidewalk		Gravel Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	0.00	89			0.00						0.00

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.45	74	0.45

CN Calculations		
	Total Area	0.45
	Composite Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.45	0.25	0.25
Impervious	0.00	0.90	0.00
Total Subcatchment	**0.5**	**-**	**0.25**

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	0.5
Impervious	1	0.00
Total	5.0	0.5

Time to Peak Calculations

Time to Peak Inputs					Uplands			Bransby Williams		Airport	
Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
75	1.75	2.33%	2.3	0.35	0.06	0.04	0.04	0.07	0.04	0.30	0.20

Appropriate calculated time to peak:	0.20	Appropriate Method:	Airport

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C201
Catchment Area (ha): 1.45

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C201

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.45
Total Area Check				1.45

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	1.40	98									1.40

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.05	74	0.05

CN Calculations		
	Total Area	1.45
	Pervious Curve Number	74

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	0.052
Impervious	1	1.40
Total	1.1	1.45

Runoff Coefficient Calculations

Land Use	**Area** (ha)	**C**	**Weighted Average C**
Pervious	0.05	0.25	0.01
Impervious	1.40	0.90	0.87
Total Subcatchment	**1.45**	**-**	**0.88**

TIMP	**0.96**
XIMP	**0.96**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	145	0.25
Impervious	2.0	1.1	100	0.013

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Project Name:	Prologis Humber Station	**By:**	MJ	**Catchment Name:**	C201R
Project Number:	624-6777	**Checked by:**	RA	**Catchment Area (ha):**	2.40
Date:	2024.04.11				

Hydrologic Parameters: STANHYD Command
Post-Development Drainage Area: Catchment C201R

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	2.4
Total Area Check				2.4

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	2.40	98									2.40
Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG										74	0.00

CN Calculations	Total Area	2.40
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	2.40	0.90	0.90
Total Subcatchment	**2.40**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	21	0.25
Impervious	1.0	1	21	0.013

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Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11
By: MJ
Checked by: RA
Catchment Name: C202
Catchment Area (ha): 1.70

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C202

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.7
Total Area Check				1.7

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	1.70	98									1.70
Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG										74	0.00

CN Calculations		
	Total Area	1.70
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	1.70	0.90	0.90
Total Subcatchment	**1.70**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	40	0.25
Impervious	2.0	1.1	100	0.013

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Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C202R
Catchment Area (ha): 2.37

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C202R

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	2.37
Total Area Check				2.37

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	2.37	98									2.37
Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG										74	0.00

CN Calculations		
	Total Area	2.37
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	2.37	0.90	0.90
Total Subcatchment	**2.37**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	21	0.25
Impervious	1.0	1	21	0.013

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Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C203
Catchment Area (ha): 1.33

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C203

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.3
Total Area Check				1.3

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	1.31	98									1.31

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.02	74	0.02

CN Calculations		
	Total Area	1.33
	Pervious Curve Number	74

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	0.022
Impervious	1	1.31
Total	1.1	1.33

Runoff Coefficient Calculations

Land Use	**Area** (ha)	**C**	**Weighted Average C**
Pervious	0.00	0.25	0.00
Impervious	1.31	0.90	0.90
Total Subcatchment	**1.31**	**-**	**0.90**

TIMP	**0.98**
XIMP	**0.98**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	40	0.25
Impervious	2.0	1.1	100	0.013

Project Name: Prologis Humber Station	**By:** MJ	**Catchment Name:**	C203R
Project Number: 624-6777	**Checked by:** RA	**Catchment Area (ha):**	2.40
Date: 2024.04.11			

CROZIER CONSULTING ENGINEERS

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C203R

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	2.4
Total Area Check				2.4

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	2.40	98									2.40
Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG										74	0.00

CN Calculations		
	Total Area	2.40
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	2.40	0.90	0.90
Total Subcatchment	**2.40**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	1	21	0.25
Impervious	1.0	1	21	0.013

Project Name: Prologis Humber Station	**By:** MJ	**Catchment Name:**	C204
Project Number: 624-6777	**Checked by:** RA	**Catchment Area (ha):**	1.61
Date: 2024.04.11			

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C204

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.6
Total Area Check				1.6

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	1.48	98									1.48
Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.13	74	0.13

CN Calculations	Total Area	1.61
	Pervious Curve Number	74

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	0.126
Impervious	1	1.48
Total	1.3	1.61

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	1.48	0.90	0.90
Total Subcatchment	**1.48**	**-**	**0.90**

TIMP	**0.92**
XIMP	**0.92**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	145	0.25
Impervious	2.0	1.1	100	0.013

Project Name: Prologis Humber Station	**By:** MJ	**Catchment Name:**	C204R
Project Number: 624-6777	**Checked by:** RA	**Catchment Area (ha):**	2.39
Date: 2024.04.11			

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C204R

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	2.4
Total Area Check				2.4

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	2.39	98									2.39

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG										74	0.00

CN Calculations		
	Total Area	2.39
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	**Area** (ha)	**C**	**Weighted Average C**
Pervious	0.00	0.25	0.00
Impervious	2.39	0.90	0.90
Total Subcatchment	**2.39**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	1	21	0.25
Impervious	1.0	1	21	0.013

Project Name:	Prologis Humber Station
Project Number:	624-6777
Date:	2024.04.11
By:	MJ
Checked by:	RA
Catchment Name:	C205
Catchment Area (ha):	1.69

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C205

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.7
Total Area Check				1.7

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	1.69	98									1.69

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG										74	0.00

CN Calculations		
	Total Area	1.69
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	1.69	0.90	0.90
Total Subcatchment	**1.69**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	40	0.25
Impervious	2.0	1.1	100	0.013

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C205R
Catchment Area (ha): 2.36

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C205R

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	2.4
Total Area Check				2.4

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	2.36	98									2.36

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG										74	0.00

CN Calculations		
	Total Area	2.36
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	2.36	0.90	0.90
Total Subcatchment	**2.36**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	1	21	0.25
Impervious	1.0	1	21	0.013

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C206
Catchment Area (ha): 1.32

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C206

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.3
Total Area Check				1.3

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	1.31	98									1.31

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.01	74	0.01

CN Calculations		
	Total Area	1.32
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	1.31	0.90	0.90
Total Subcatchment	**1.3**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	40	0.25
Impervious	2.0	1.1	100	0.013

CROZIER
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Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C206R
Catchment Area (ha): 2.39

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C206R

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	2.4
Total Area Check				2.4

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	2.39	98									2.39

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG										74	0.00

CN Calculations		
	Total Area	2.39
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	2.39	0.90	0.90
Total Subcatchment	**2.4**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	1	21	0.25
Impervious	1.0	1	21	0.013

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C207A
Catchment Area (ha): 1.24

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C207A

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.2
Total Area Check				1.2

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	1.24	89									1.24

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.08	74	0.08

CN Calculations		
	Total Area	1.32
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	1.24	0.90	0.90
Total Subcatchment	**1.2**	**-**	**0.90**

TIMP	**0.94**
XIMP	**0.94**

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	0.084
Impervious	1	1.24
Total	1.3	1.32

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	40	0.25
Impervious	2.0	2.5	60	0.013

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C207B
Catchment Area (ha): 1.41

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C207B

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.4
Total Area Check				1.4

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	1.41	89									1.41

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.10	74	0.10

CN Calculations		
	Total Area	1.51
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	1.41	0.90	0.90
Total Subcatchment	**1.4**	**-**	**0.90**

TIMP	**0.93**
XIMP	**0.93**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	40	0.25
Impervious	2.0	2.5	60	0.013

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C208A
Catchment Area (ha): 1.45

Hydrologic Parameters: STANDHYD Command
Pre-Development Drainage Area: Catchment C208A

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	1.5
Total Area Check				1.5

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	1.08	98									1.08
Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.37	74	0.37

CN Calculations		
	Total Area	1.45
	Pervious Curve Number	74

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	0.370
Impervious	1	1.08
Total	2.0	1.45

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	1.08	0.90	0.90
Total Subcatchment	**1.1**	**-**	**0.90**

TIMP	**0.74**
XIMP	**0.74**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	40	0.25
Impervious	2.0	2	AUTO	0.013

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C208B
Catchment Area (ha): 0.59

Hydrologic Parameters: STANDHYD Command
Pre-Development Drainage Area: Catchment C208B

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	0.6
Total Area Check				0.6

Impervious Landuses Present:											
	Roadway/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	0.59	89									0.59

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.26	74	0.26

CN Calculations		
	Total Area	0.85
	Composite Curve Number	84

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	0.59	0.90	0.90
Total Subcatchment	**0.6**	**-**	**0.90**

TIMP	**0.69**
XIMP	**0.69**

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	0.261
Impervious	1	0.59
Total	2.2	0.85

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	40	0.25
Impervious	1.0	2	AUTO	0.013

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C209
Catchment Area (ha): 11.38

Hydrologic Parameters: STANDHYD Command
Pre-Development Drainage Area: Catchment C209

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	11.4
Total Area Check				11.4

Impervious Landuses Present:	Roadway/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	11.38	89									11.38

Pervious Landuses Present:	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG										74	0.00

CN Calculations		
	Total Area	11.38
	Composite Curve Number	89

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	11.38	0.90	0.90
Total Subcatchment	**11.4**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	0.000
Impervious	1	11.38
Total	1.0	11.38

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	145	0.25
Impervious	1.0	2	AUTO	0.013

Project Name:	Prologis Humber Station	**By:**	MJ	**Catchment Name:**	C210
Project Number:	624-6777	**Checked by:**	RA	**Catchment Area (ha):**	10.90
Date:	2024.04.11				

Hydrologic Parameters: STANDHYD Command
Pre-Development Drainage Area: Catchment C210

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	10.9
Total Area Check				10.9

Impervious Landuses Present:											
	Roadway/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	10.90	89									10.90

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG							0.00	74			0.00

CN Calculations	Total Area	10.90
	Composite Curve Number	89

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.00	0.25	0.00
Impervious	10.90	0.90	0.90
Total Subcatchment	**10.9**	**-**	**0.90**

TIMP	**0.99**
XIMP	**0.99**

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	0.000
Impervious	1	10.90
Total	1.0	10.90

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	145	0.25
Impervious	1.0	2	AUTO	0.013

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: PH1A
Catchment Area (ha): 26.06

Hydrologic Parameters: STANDHYD Command
Post-Development Drainage Area: Catchment C201

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	C	100	26.06
Total Area Check				26.06

Impervious Landuses Present:											
	Paved/Rooftops		Sidewalk		Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	25.85	98									25.85

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Meadows		Landscape/Lawn		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									0.32	74	0.32

CN Calculations		
	Total Area	26.16
	Pervious Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	0.32	0.25	0.00
Impervious	25.85	0.90	0.89
Total Subcatchment	**26.16**	**-**	**0.89**

TIMP	**0.99**
XIMP	**0.99**

Flow Length Calculations

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	145	0.25
Impervious	2.0	1.1	100	0.013

Project Name: Prologis Humber Station
Project Number: 624-6777
Date: 2024.04.11

By: MJ
Checked by: RA

Catchment Name: C103
Catchment Area (ha): 3.77

CROZIER CONSULTING ENGINEERS

Hydrologic Parameters: NASHYD Command
Pre-Development Drainage Area: Catchment C103

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic Group	% Area	Area
Monogham Clay Loam	MOG	D	100	3.8
Total Area Check				3.8

Impervious Landuses Present:											
	Roadway		Sidewalk		Gravel Parking Lot		Building		SWMF		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG	0.00	89			0.00						0.00

Pervious Landuses Present:											
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotal
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area
MOG									3.77	74	3.77

CN Calculations		
	Total Area	3.77
	Composite Curve Number	74

Runoff Coefficient Calculations

Land Use	Area (ha)	C	Weighted Average C
Pervious	3.77	0.25	0.25
Impervious	0.00	0.90	0.00
Total Subcatchment	**3.8**	**-**	**0.25**

Initial Abstraction Calculations

Landuse	IA (mm)	Area (ha)
Pervious	5	3.8
Impervious	1	0.00
Total	5.0	3.8

Time to Peak Calculations

Time to Peak Inputs					Uplands			Bransby Williams		Airport	
Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
530	5.34	1.01%	2.3	0.23	0.64	0.38	0.38	0.44	0.29	1.06	0.71

Appropriate calculated time to peak:	0.71	Appropriate Method:	Airport

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project No: 0624-6777
Date: 2024.11.04
Designed by: MJ
Reviewed by: RA

Humber River Unitary Flow Rates Summary - Phase 1A - Interim Conditions
Outlet to Clarkway Drive Tributary

Clarway Trib Area = **9.56** ha

Humber River Watershed Sub-Basin 36	
Return Period	**Controlled Release Rate** (L/s/ha)
2-Year	7.9
5-Year	12.1
10-Year	14.9
25-Year	18.7
50-Year	21.9
100-Year	24.7

NOTE:
1) Q - unit flow (L/s/ha - litres per second per hectare)
2) A - area in hectares (ha).
3) Pre-development unit flow rate area
4) Equation: 29.912-2.316*LN(Area)

Sub-Basin ID **36**

Return Period	**Calculated Unit Flow Rate**	
	L/s	(m^3/s)
2-Year	75.4	0.075
5-Year	115.6	0.116
10-Year	142.0	0.142
25-Year	178.9	0.179
50-Year	209.0	0.209
100-Year	236.0	0.236

Project Name:	Prologis Humber Station
Project No:	0624-6777
Date:	2024.11.04
Designed by:	HL
Reviewed by:	RA

Humber River Unitary Flow Rates Summary - Phase 1A - Ultimate Conditions
Outlet to SWM Pond 3

CEISMP Area **64.22** ha

Humber River Watershed Sub-Basin 36	
Return Period	**Controlled Release Rate** (L/s/ha)
2-Year	6.51
5-Year	9.92
10-Year	12.24
25-Year	15.39
50-Year	17.90
100-Year	20.27

NOTE:
1) Q - unit flow (L/s/ha - litres per second per hectare)
2) A - area in hectares (ha).
3) Pre-development unit flow rate area
4) Equation: 29.912-2.316*LN(Area)

5) The controlled release rates are calculated with 64.2 ha, and consistent with Table 4.10 in the CEISMP Phase 2 Report (Schaeffers, August 2024).

Sub-Basin ID **36**
Existing Contributing Area **29.52** ha

Return Period	**Calculated Unit Flow Rate**	
	L/s	(m^3/s)
2-Year	192.3	0.192
5-Year	292.9	0.293
10-Year	361.4	0.361
25-Year	454.3	0.454
50-Year	528.4	0.528
100-Year	598.4	0.598

NOTE:
1) Existing contributing areas are based on Drawing C120: Pre-development Drainage Plan.

Regional Flow Criteria

Humber River Catchment ID	**Colour (Outlet)**	**Regional Release Rate** (L/s/ha)
43.10	Blue (HDF-6)	136.0
43.03	Orange (HDF-8)	71.0
43.06	Green (HDF-14)	102.5

Description	**Existing Contributing Area** (ha)	**Humber River Catchment ID**	**Colour (Outlet)**	**Regional Release Rate** (L/s/ha)	**Total Regional Release Rate** (m^3/s)
Phase 1A	1.47	43.10	Blue (HDF-6)	200.3	2.227
	26.92	43.03	Orange (HDF-8)	1911.5	
	1.12	43.06	Green (HDF-14)	115.0	
Street A	1.04	43.03	Orange (HDF-8)	73.8	0.112
	0.37	43.06	Green (HDF-14)	37.9	

NOTE:
1) Street A will be George Bolton Parkway in the ultimate condition.

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project No: 0624-6777
Date: 11-20-24
Designed by: MJ
Reviewed by: RA

Diverted Area Changes

CATCHMENT ID	AREA (ha)	DIVERTED SITE CATCHMENTS	DIVERTED SITE CATCHMENT AREA (ha)	AREA W/O DIVERTED AREA (ha)
41.07	101.08	UC02	0.15	96.10
		C201	0.10	
		C201R	0.40	
		C204	1.61	
		C204R	1.97	
		C205	0.69	
		C205R	0.05	
TOTAL			**4.98**	
43.10	202.72	UC01	0.49	194.79
		UC02	0.83	
		C201	1.35	
		C201R	2.00	
		C202	1.70	
		C202R	0.55	
		C203	0.81	
		C203R	0.22	
TOTAL			**7.94**	
43.06	35.79	UC01	0.95	33.31
		C203	0.52	
		C203R	0.20	
		C207B	0.80	
TOTAL			**2.47**	
43.03	63.04	C202R	1.82	49.11
		C203R	1.98	
		C204	0.00	
		C204R	0.42	
		C205	1.00	
		C205R	2.31	
		C206	1.32	
		C206R	2.39	
		C207A	1.24	
		C208A	1.45	
TOTAL			**13.93**	

Project Name: Prologis Humber Station
Project No: 0624-6777
Date: 11-20-24
Designed by: MJ
Reviewed by: RA

2 Year Results

J124

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J124	2 YEAR	Uncontrolled	2.490	0.000	10.489	10.438	9.514	10.531	10.531	9.471	0.4	0.9	-0.5
		Unit Flow Rate	0.075	0.980				10.214	10.170	9.294	-2.6	-2.6	-2.3
		Unit Flow Rate x 4	0.300	0.705				10.450	10.408	9.511	-0.4	-0.3	0.0
		Proposed Solution	0.192	0.652				10.311	10.273	9.390	-1.7	-1.6	-1.3

J4200.683

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J4200.683	2 YEAR	Uncontrolled	2.490	0.000	10.618	11.133	10.470	10.651	11.185	10.514	0.3	0.5	0.4
		Unit Flow Rate	0.075	0.980				10.407	10.919	10.278	-2.0	-1.9	-1.8
		Unit Flow Rate x 4	0.300	0.705				10.641	11.157	10.497	0.2	0.2	0.3
		Proposed Solution	0.192	0.652				10.505	11.019	10.383	-1.1	-1.0	-0.8

J1700.594

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J1700.594	2 YEAR	Uncontrolled	2.490	0.000	10.510	11.502	11.118	10.589	11.571	11.177	0.8	0.6	0.5
		Unit Flow Rate	0.075	0.980				10.368	11.341	10.967	-1.4	-1.4	-1.4
		Unit Flow Rate x 4	0.300	0.705				10.556	11.546	11.157	0.4	0.4	0.4
		Proposed Solution	0.192	0.652				10.448	11.437	11.070	-0.6	-0.6	-0.4

Scenarios:

Uncontrolled	Divereted all flows from Phase 1A without controls
Unit Flow Rate	Phase 1A controlled to unitary flow rates
Unit Flow Rate x 4	Phase 1A controlled to unitary flow rates x 4
Proposed Solution	Phase 1A controlled to CEISMP requriements

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project No: 0624-6777
Date: 11-20-24
Designed by: MJ
Reviewed by: RA

5 Year Results

J124

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J124	5 YEAR	Uncontrolled	3.332	0.000	16.855	15.901	13.683	16.891	15.995	13.552	0.2	0.6	-1.0
		Unit Flow Rate	0.116	1.227				16.456	15.540	13.340	-2.4	-2.3	-2.5
		Unit Flow Rate x 4	0.464	0.921				16.823	15.887	13.646	-0.2	-0.1	-0.3
		Proposed Solution	0.293	0.808				16.592	15.665	13.469	-1.6	-1.5	-1.6

J4200.683

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J4200.683	5 YEAR	Uncontrolled	3.33	0.000	17.191	17.012	15.193	17.253	17.048	15.175	0.4	0.2	-0.1
		Unit Flow Rate	0.116	1.227				16.856	16.683	14.865	-1.9	-1.9	-2.2
		Unit Flow Rate x 4	0.464	0.921				17.223	17.038	15.185	0.2	0.2	-0.1
		Proposed Solution	0.293	0.808				16.998	16.818	15.004	-1.1	-1.1	-1.2

J1700.594

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J1700.594	5 YEAR	Uncontrolled	3.33	0.000	16.180	16.876	15.643	16.289	16.968	15.705	0.7	0.5	0.4
		Unit Flow Rate	0.116	1.227				15.957	16.640	15.402	-1.4	-1.4	-1.5
		Unit Flow Rate x 4	0.464	0.921				16.227	16.924	15.671	0.3	0.3	0.2
		Proposed Solution	0.293	0.808				16.075	16.761	15.536	-0.6	-0.7	-0.7

Scenarios:

Uncontrolled	Divereted all flows from Phase 1A without controls
Unit Flow Rate	Phase 1A controlled to unitary flow rates
Unit Flow Rate x 4	Phase 1A controlled to unitary flow rates x 4
Proposed Solution	Phase 1A controlled to CEISMP requriements

Project Name: Prologis Humber Station
Project No: 0624-6777
Date: 11-20-24
Designed by: MJ
Reviewed by: RA

10 Year Results

J124

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J124	10 YEAR	Uncontrolled	3.899	0.000	21.382	19.869	16.517	21.385	19.930	16.395	0.0	0.3	-0.7
		Unit Flow Rate	0.142	1.430				20.865	19.399	16.153	-2.4	-2.4	-2.2
		Unit Flow Rate x 4	0.568	1.071				21.314	19.817	16.518	-0.3	-0.3	0.0
		Proposed Solution	0.361	0.882				21.053	19.567	16.312	-1.5	-1.5	-1.2

J4200.683

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J4200.683	10 YEAR	Uncontrolled	3.899	0.000	21.659	21.079	18.479	21.767	21.147	18.437	0.5	0.3	-0.2
		Unit Flow Rate	0.142	1.430				21.249	20.682	18.099	-1.9	-1.9	-2.1
		Unit Flow Rate x 4	0.568	1.071				21.714	21.118	18.475	0.3	0.2	0.0
		Proposed Solution	0.361	0.882				21.444	20.862	18.269	-1.0	-1.0	-1.1

J1700.594

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J1700.594	10 YEAR	Uncontrolled	3.899	0.000	20.046	20.626	18.766	20.214	20.755	18.814	0.8	0.6	0.3
		Unit Flow Rate	0.142	1.430				19.744	20.305	18.480	-1.5	-1.6	-1.5
		Unit Flow Rate x 4	0.568	1.071				20.120	20.694	18.771	0.4	0.3	0.0
		Proposed Solution	0.361	0.882				19.912	20.478	18.624	-0.7	-0.7	-0.8

<u>Scenarios:</u>

Uncontrolled	Divereted all flows from Phase 1A without controls
Unit Flow Rate	Phase 1A controlled to unitary flow rates
Unit Flow Rate x 4	Phase 1A controlled to unitary flow rates x 4
Proposed Solution	Phase 1A controlled to CEISMP requriements

Project Name:	Prologis Humber Station
Project No:	0624-6777
Date:	11-20-24
Designed by:	MJ
Reviewed by:	RA

25 Year Results

J124

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J124	25 YEAR	Uncontrolled	4.617	0.000	28.307	25.297	20.462	28.374	25.269	20.268	0.2	-0.1	-0.9
		Unit Flow Rate	0.179	1.666				27.304	24.644	19.992	-3.5	-2.6	-2.3
		Unit Flow Rate x 4	0.716	1.248				27.877	25.162	20.439	-1.5	-0.5	-0.1
		Proposed Solution	0.454	0.977				27.588	24.894	20.191	-2.5	-1.6	-1.3

J4200.683

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J4200.683	25 YEAR	Uncontrolled	4.62	0.000	27.434	26.436	22.857	27.711	26.707	22.835	1.0	1.0	-0.1
		Unit Flow Rate	0.179	1.666				26.925	25.994	22.399	-1.9	-1.7	-2.0
		Unit Flow Rate x 4	0.716	1.248				27.523	26.557	22.874	0.3	0.5	0.1
		Proposed Solution	0.454	0.977				27.202	26.253	22.616	-0.8	-0.7	-1.1

J1700.594

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J1700.594	25 YEAR	Uncontrolled	4.62	0.000	25.359	25.603	23.045	25.563	25.788	23.174	0.8	0.7	0.6
		Unit Flow Rate	0.179	1.666				25.005	25.244	22.698	-1.4	-1.4	-1.5
		Unit Flow Rate x 4	0.716	1.248				25.465	25.703	23.113	0.4	0.4	0.3
		Proposed Solution	0.454	0.977				25.218	25.461	22.895	-0.6	-0.6	-0.7

Scenarios:

Uncontrolled	Divereted all flows from Phase 1A without controls
Unit Flow Rate	Phase 1A controlled to unitary flow rates
Unit Flow Rate x 4	Phase 1A controlled to unitary flow rates x 4
Proposed Solution	Phase 1A controlled to CEISMP requriements

CROZIER
CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project No: 0624-6777
Date: 11-20-24
Designed by: MJ
Reviewed by: RA

50 Year Results

J124

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J124	50 YEAR	Uncontrolled	5.156	0.000	33.397	29.734	23.623	33.503	29.820	23.421	0.3	0.3	-0.9
		Unit Flow Rate	0.209	1.837				32.624	29.124	23.125	-2.3	-2.1	-2.1
		Unit Flow Rate x 4	0.836	1.378				33.293	29.723	23.633	-0.3	0.0	0.0
		Proposed Solution	0.528	1.019				32.952	29.420	23.352	-1.3	-1.1	-1.1

J4200.683

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J4200.683	50 YEAR	Uncontrolled	5.16	0.000	33.683	30.984	26.431	33.913	31.217	26.373	0.7	0.8	-0.2
		Unit Flow Rate	0.209	1.837				32.936	30.169	25.901	-2.2	-2.6	-2.0
		Unit Flow Rate x 4	0.836	1.378				33.573	30.957	26.454	-0.3	-0.1	0.1
		Proposed Solution	0.528	1.019				33.253	30.569	26.155	-1.3	-1.3	-1.0

J1700.594

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J1700.594	50 YEAR	Uncontrolled	5.16	0.000	29.487	29.269	26.261	29.736	29.501	26.409	0.8	0.8	0.6
		Unit Flow Rate	0.209	1.837				29.023	28.864	25.871	-1.6	-1.4	-1.5
		Unit Flow Rate x 4	0.836	1.378				29.603	29.403	26.349	0.4	0.5	0.3
		Proposed Solution	0.53	1.019				29.305	29.115	26.093	-0.6	-0.5	-0.6

Scenarios:

Uncontrolled	Divereted all flows from Phase 1A without controls
Unit Flow Rate	Phase 1A controlled to unitary flow rates
Unit Flow Rate x 4	Phase 1A controlled to unitary flow rates x 4
Proposed Solution	Phase 1A controlled to CEISMP requriements

CROZIER CONSULTING ENGINEERS

Project Name: Prologis Humber Station
Project No: 0624-6777
Date: 11-20-24
Designed by: MJ
Reviewed by: RA

100 Year Results

J124

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J124	100 YEAR	Uncontrolled	5.693	0.000	39.218	34.135	27.208	39.106	34.202	26.918	-0.3	0.2	-1.1
		Unit Flow Rate	0.236	2.014				38.351	33.452	26.591	-2.2	-2.0	-2.3
		Unit Flow Rate x 4	0.944	1.513				39.105	34.122	27.162	-0.3	0.0	-0.2
		Proposed Solution	0.598	1.064				38.707	33.775	26.853	-1.3	-1.1	-1.3

J4200.683

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J4200.683	100 YEAR	Uncontrolled	5.69	0.000	39.415	35.964	30.467	39.739	36.131	30.346	0.8	0.5	-0.4
		Unit Flow Rate	0.236	2.014				38.657	35.285	29.799	-1.9	-1.9	-2.2
		Unit Flow Rate x 4	0.944	1.513				39.403	35.934	30.459	0.0	-0.1	0.0
		Proposed Solution	0.598	1.064				39.008	35.594	30.108	-1.0	-1.0	-1.2

J1700.594

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)			Post-dev Peak Flow (m3/s)			Percent Increase (%)		
					6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR	6 HOUR	12 HOUR	24 HOUR
J1700.594	100 YEAR	Uncontrolled	5.69	0.000	34.201	33.286	29.516	34.558	33.611	29.697	1.0	1.0	0.6
		Unit Flow Rate	0.236	2.014				33.547	32.727	29.088	-1.9	-1.7	-1.5
		Unit Flow Rate x 4	0.944	1.513				34.305	33.414	29.620	0.3	0.4	0.4
		Proposed Solution	0.598	1.064				33.911	33.043	29.338	-0.8	-0.7	-0.6

Scenarios:

Uncontrolled	Divereted all flows from Phase 1A without controls
Unit Flow Rate	Phase 1A controlled to unitary flow rates
Unit Flow Rate x 4	Phase 1A controlled to unitary flow rates x 4
Proposed Solution	Phase 1A controlled to CEISMP requriements

Project Name: Prologis Humber Station
Project No: 0624-6777
Date: 11-20-24
Designed by: MJ
Reviewed by: RA

Regional Results

J124

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)	Post-dev Peak Flow (m3/s)	Percent Increase (%)
J124	Hazel1000	Uncontrolled	4.303	0.000	76.143	77.841	2.2
		Unit Flow Rate	0.679	4.965		75.200	-1.2
		Unit Flow Rate x 2.5	1.697	3.362		76.101	-0.1
		CEISMP	3.362	1.654		75.769	-0.5

J4200.683

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)	Post-dev Peak Flow (m3/s)	Percent Increase (%)
J4200.683	Hazel1000	Uncontrolled	4.303	0.000	90.288	92.357	2.3
		Unit Flow Rate	0.679	4.965		89.299	-1.1
		Unit Flow Rate x 2.5	1.697	3.362		90.246	0.0
		CEISMP	3.362	1.654		89.917	-0.4

J1700.594

ADDHYD	Storm Event	Scenario	Phase 1A Release Rate (m3/s)	Phase 1A Storage (ha.m)	Pre-dev Peak Flow (m3/s)	Post-dev Peak Flow (m3/s)	Percent Increase (%)
J1700.594	Hazel1000	Uncontrolled	4.303	0.000	110.616	112.683	1.9
		Unit Flow Rate	0.679	4.965		109.800	-0.7
		Unit Flow Rate x 2.5	1.697	3.362		110.594	0.0
		CEISMP	3.362	1.654		110.332	-0.3

Scenarios:

Uncontrolled	Divereted all flows from Phase 1A without controls
Unit Flow Rate	Phase 1A controlled to regional unitary flow rates
Unit Flow Rate x 2.5	Phase 1A controlled to regional unitary flow rates x 2.5
CEISMP	Phase 1A controlled to CEISMP requirements

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TEMPORARY BENCHMARKS:

ELEVATION ARE REFERRED TO THE REGION OF PEEL BENCHMARK No. 40 LOCATED ON THE SOUTH FACE AT THE WEST CORNER OF SOUTH END OF A CONCRETE BOX CULVERT ACROSS MAYFIELD ROAD APPROXIMATELY 0.56 km EAST OF CLARKWAY DRIVE, HAVING AN ELEVATION OF 222.165 m. VERTICAL DATUM: CANADIAN GEODETIC DATUM, 1928 (1978 SOUTHERN ONTARIO READJUSTMENT)

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN PETROFF.
DRAWING No.: A100.0, DATED: 19/APR/2024
PROJECT No.: 22095.00

Town

No.	ISSUE	DATE: MMM/DD/YYYY
0	ISSUED FOR SPA SUBMISSION 1B	NOV/20/2024

Engineer

Engineer

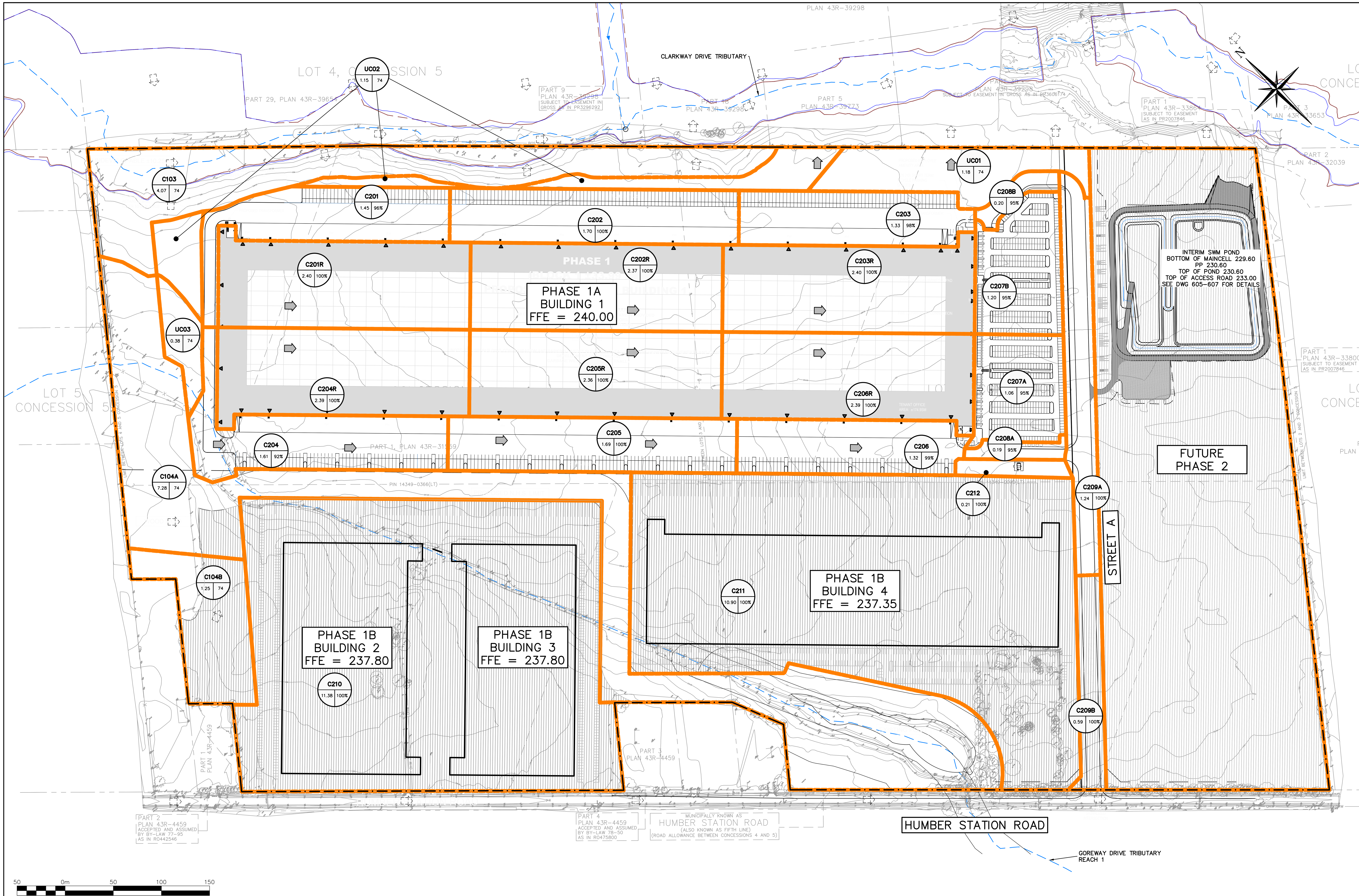
FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

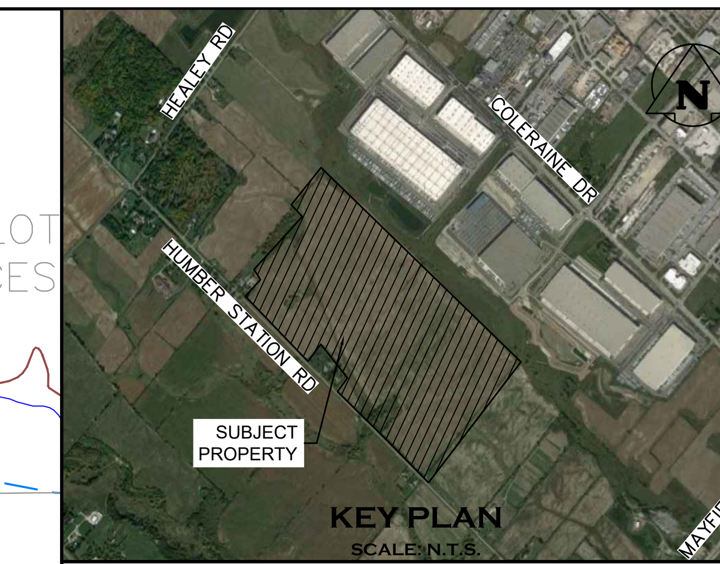
Project
HUMBER STATION DISTRIBUTION CENTRE
TOWN OF CALEDON

Drawing
INTERIM CONDITIONS TARGET RELEASE RATE

CROZIER
CONSULTING ENGINEERS

Drawn By Y.K.	Design By M.F.	Project 624-6777
Check By R.A.	Check By R.A.	Drawing FIG 01





LEGEND

- EX. WATERCOURSE
- PR. PROPERTY LIMITS
- PR. STORM CATCHMENT AREA
- CATCHMENT AREA ID (C201R)
- RUNOFF COEFFICIENT (0.79)
- DRAINAGE AREA (ha) (2.40)
- PR. OVERLAND FLOW DIRECTION
- EX. OVERLAND FLOW DIRECTION
- FUTURE AREAS
- PR. REGIONAL FLOODLINE
- PR. 100-YR FLOODLINE

NOT FOR CONSTRUCTION

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TEMPORARY BENCHMARKS:

ELEVATION ARE REFERRED TO THE REGION OF PEEL BENCHMARK No. 40 LOCATED ON THE SOUTH FACE AT THE WEST CORNER OF SOUTH END OF A CONCRETE BOX CULVERT ACROSS MAYFIELD ROAD APPROXIMATELY 0.56 km EAST OF CLARKWAY DRIVE, HAVING AN ELEVATION OF 222.165 m. VERTICAL DATUM: CANADIAN GEODETIC DATUM, 1928 (1978 SOUTHERN ONTARIO READJUSTMENT)

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN PETROFF.
DRAWING No.: A100.0, DATED: 19/APR/2024
PROJECT No.: 22095.00

Town

No.	ISSUE	DATE: MMM/DD/YYYY
01	ISSUED FOR SPA SUBMISSION 1B	NOV/20/2024

Engineer

Engineer

Project

HUMBER STATION DISTRIBUTION CENTRE
TOWN OF CALEDON

Drawing

INTERIM CONDITIONS DRAINAGE FIGURE

CROZIER CONSULTING ENGINEERS

Drawn By	Y.K.	Design By	M.F.	Project	624-6777
Check By	R.A.	Check By	R.A.	Drawing	FIG 02

LEGEND

- PR. STORM CATCHMENT AREA
- TRCA CATCHMENT BOUNDARY
- 43.03 CATCHMENT AREA DIVERTED TO CLARKWAY TRIBUTARY
- 41.07 CATCHMENT AREA DIVERTED TO CLARKWAY TRIBUTARY
- ANALYZED NODE WITHIN THE TRCA HUMBER VO MODEL

200 0m 200 400 600 800

SCALE: 1:10 000

NOT FOR CONSTRUCTION

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2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

TEMPORARY BENCHMARKS:

ELEVATION ARE REFERRED TO THE REGION OF PEEL BENCHMARK No. 40 LOCATED ON THE SOUTH FACE AT THE WEST CORNER OF SOUTH END OF A CONCRETE BOX CULVERT ACROSS MAYFIELD ROAD APPROXIMATELY 0.56 km EAST OF CLARKWAY DRIVE, HAVING AN ELEVATION OF 222.165 m. VERTICAL DATUM: CANADIAN GEODETIC DATUM, 1928 (1978 SOUTHERN ONTARIO READJUSTMENT)

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN PETROFF.
DRAWING No.: A100.0, DATED: 19/APR/2024
PROJECT No.: 22095.00

Town

No.	ISSUE	DATE: MMM/DD/YYYY
0	ISSUED FOR SPA SUBMISSION 1B	NOV/20/2024

Engineer

Engineer

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

Project

HUMBER STATION DISTRIBUTION CENTRE
TOWN OF CALEDON

Drawing

INTERIM CONDITIONS DIVERTED DRAINAGE AREAS

CROZIER
CONSULTING ENGINEERS

Drawn By	Y.K.	Design By	M.F.	Project	624-6777
Check By	R.A.	Check By	R.A.	Drawing	FIG 03