

Project No.: DEL20-024

Date: March, 2021

PREPARED FOR:
TBR Land Development Inc.

Functional Servicing Report

Sinclair Avenue Subdivision

St. Thomas, Ontario



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1.0 INTRODUCTION

Development Engineering (London) Limited (DevEng) has been retained by TBR Land Development Inc. to undertake the site engineering and stormwater management (SWM) design for a proposed 19 lot residential subdivision located on Sinclair Avenue, (Lot 91 of Registered Plan 209) St. Thomas, Ontario. This report outlines the proposed servicing design for the subject development.

2.0 EXISTING CONDITIONS

The subject subdivision is approximately 1.1 ha and located in the east end of the City of St. Thomas and is bounded by existing residential properties fronting Sinclair Avenue to the south, existing residential properties to the east, undeveloped, abandoned Canadian National Railway (CN) lands including an existing ditch to the north, and Fairview Avenue to the west.

The subdivision is currently comprised entirely of undeveloped grassed lands with topographical variation in elevations ranging from 242.1m in the southeast corner of the site to approximately 237.3m in the northwest corner of the site. A geotechnical investigation was performed by EXP Services Inc. (EXP) on December 14, 2020 and generally describes the underlying soils on the subject site as a layer of fill (clayey silt to sand) below topsoil ranging from 0.7-2.9m in thickness, overlying clayey silt till.

Adjacent land uses are as follows:

- East – existing single family residential dwellings (Lot 92 – Sinclair Ave.)
- North – abandoned CN Rail and undeveloped lands,
- West – Fairview Ave.
- South – existing single family residential dwellings (fronting Sinclair Ave)



Figure 1 - Aerial Photograph of the Subject Site (Source – Bing Maps)

2.1 EXISTING SERVICES

Water: Existing potable water infrastructure consists of a 150 mm diameter municipal watermain located on the north side of Sinclair Avenue in the Right-of-Way (ROW). The design and construction of the existing watermain were previously completed in 2020.

Sanitary: Existing external infrastructure consists of a 250 mm diameter municipal gravity sanitary sewer located within the ROW on the south side of Sinclair Avenue. Based on as constructed drawings from the City of St. Thomas, it is noted this sewer run extends west on Sinclair Avenue, which makes its way to a pumping station, before ultimately discharging into the St. Thomas Water Pollution Control Plant.

Storm: Existing drainage from the subject site currently sheets to the northwest, routing into the existing ditch located on the former railway corridor, ultimately outletting through existing clay culverts located underneath Fairview Avenue to the west. Existing drainage from the external, existing residential lands which face Sinclair Avenue and the existing ROW enter through one of two catchbasins located within the Sinclair Avenue ROW. The flows from these catchbasins flow through an existing 250mm culvert and ultimately outlet onto the subject site.

Transportation: The road connection to the proposed subdivision is Sinclair Avenue to the south. Sinclair Avenue runs east to west and terminates at the west side of the new subdivision. The road termination for Sinclair Avenue consists of a circular turnaround just east of Fairview Avenue. To the east, Sinclair Avenue meets with Ripley Lane and ultimately ends at Manor Road.

3.0 SUBDIVISION DESIGN

The proposed development is intended to be a low density, residential area which integrates into the existing Fairview Manor Subdivision. The proposed development is to be situated within walking distance of Elgin Mall as well as other commercial, educational, religious, and retail establishments. The proposed subdivision plan consists of 19 single family lots ranging in size from 11.49 to 13.0 meters in frontage. The subdivision is also intended to include rear-yard storage complete with quality control treatment at the back of the lots to attenuate and treat stormwater runoff.

Based on preliminary design, it is anticipated this development will consist of a combination of cut and fill conditions. It is anticipated final construction grades will generally fall from south to north, and east to west across the site, mimicking the existing site topography. The subdivision is currently being presented as a single-phase development for design.

4.0 SANITARY SERVICING

4.1 PROPOSED SANITARY SEWERSHED

The existing municipal sanitary sewershed in the vicinity of the subject site and proposed sanitary network is identified in **Figure 2**.

The total site area is approximately 1.1 ha which includes low density residential and a small, undeveloped parcel of land to the west. The estimated population and sanitary flows for the proposed development have been determined and are summarized below in Table 1.

Table 1 – Summary of Assumed Design Population

Total Sanitary Flow – Low Density Residential				
Development Area(ha)/Lots(#)	Estimated Population	Q _{people} (L/s)	Q _{infiltration} (L/s)	Q _{total} (L/s)
1.1/19	57	0.16	0.11	0.27

Note: Flows above calculated using a per capita flow of 250 L/capita/day, Low density assumed to be 3 people/unit (19 proposed SF lots). Infiltration and inflow are estimated at 8,640 L/ha/day. Information taken from St. Thomas Design Guidelines.

Sanitary Servicing Strategy

It is recommended that all sanitary private drain connections (PDCs) be tied into existing infrastructure located along Sinclair Avenue.

5.0 WATER SERVICING

5.1 WATER SERVICING STRATEGY

The existing water network external to the proposed development and proposed watermain network is identified on **Figure 3**.

The entire development will be serviced by individual water services to the existing 150 mm diameter municipal PVC watermain located on Sinclair Avenue. No special design considerations are anticipated for the successful completion of this development. The existing watermain including capacity of the predesigned watermain is to be designed in conjunction with the City during detailed design.

6.0 STORMWATER MANAGEMENT

6.1 STORM SERVICING STRATEGY

As mentioned in Section 2.1, the subject site currently sheets drainage northwest to an existing ditch located beside an abandoned railway line which conveys stormwater through existing clay culverts under Fairview Avenue to the west.

A new grading strategy is proposed to collect and convey stormwater from the majority (0.97 ha) of the subject development's drainage area to the dry basin, while the existing, external area tributary to the site as well as the front yards of the houses will be directed to the CN railway corridor as per existing conditions. The dry basin will be designed for attenuation as well as vegetation for water treatment.

Due to grading restraints on the subject development, a small portion of the site (0.3 ha) and the front yards (0.15 ha), is proposed to sheet uncontrolled North to the abandoned railway. The uncontrolled area is entirely comprised of an existing grassed field and is not anticipated to require quality treatment or quantity attenuation before entering the ditch. The existing storm sewers external to the subject development and the proposed storm areas are identified on **Figure 4**.

6.2 SWM TARGETS

Since the subject site is directly tributary to an existing stormwater outlet. The following targets have been used in the preliminary dry basin analysis:

- Match or reduce post-development peak discharge rates to those of the pre-development condition for all design storm events from the 2-year up to and including the 100-year storm;
- Provide 'normal' level of protection (70% TSS removal) as defined by the Ministry of Environment, Conservation, and Parks; and,
- Provide erosion and sediment control during construction to protect the tributary storm outlet.

6.3 QUANTITY CONTROL

The proposed dry basin would provide surface quantity control which temporarily attenuates stormwater prior to being discharged through controlled release outlets. The proposed surface runoff attenuation storage is approximately 180m² in surface area at the bottom, 720m² in surface area at the top and 0.5m deep and located along the back of the proposed rear-yards. The proposed dry basin has approximately 225m³ of total runoff storage. A 0.3 m deep, 5m wide overflow weir from the dry basin is proposed to convey major flows that exceed the capacity of the dry basin north to the railway corridor. The dry basin is anticipated to require an orifice on its lowest outlet to restrict post development discharge rates. A second, higher outlet is anticipated to provide redundancy to the system in the case of the lower outlet becoming blocked. Due to grading restrictions and no storm network to promote control in the right of way, a portion of the site will flow uncontrolled, outletting to the existing railway corridor. Preliminary modelling has shown that due to these restrictions, a minor peak flow increase of 25 L/s in the 2-year storm event will be released to the corridor when compared to existing conditions outflow. Minor peak flow increases in the 5-year and 10-year storm event (24 L/s and 4 L/s, respectively) will also occur, however; during the 25-year storm event to the 100-year storm event, the dry pond will over control outflow to a maximum release rate of 327L/s in the 100-year storm event (92 L/s less than existing conditions). PCSWMM model results will be performed to confirm pre-development and post-development peak flows, drawdown times, attenuation volumes, and the proposed orifice/outlet sizes and elevations during detailed design.

6.4 QUALITY CONTROL

The subject site is within the Kettle Creek Conservation Authority and external to any regulated areas. Due to the site being external to a regulated area, the proposed level of treatment for the subject development is 'Normal' (70% TSS removal) as defined by the Ministry of Environment, Conservation, and Parks (MECP). The runoff entering the dry basin will essentially be clean runoff as it includes only runoff from roofs and grassed rear yards. The dry basin will be grassed, adding a level of pre-treatment before outletting into the corridor. Due to the runoff being clean and the basin having a level of treatment through vegetation, no extra quality controls are proposed.

7.0 TRANSPORTATION

7.1 EXISTING ROADWAYS

The main street impacted by the proposed subdivision is Sinclair Street. Sinclair street is an east-west local road with a two-lane cross section and no sidewalks. Other existing roadways effected are Manor Road, Ripley Lane and Highview Drive, and all consist of a two-lane cross section and contain at least one sidewalk.

7.2 TRANSPORTATION IMPACT BRIEF – PARADIGM TRANSPORTATION SOLUTIONS LIMITED

A Draft Traffic Impact Brief was completed by Paradigm Design Solutions Limited as summarized in a brief letter dated October, 2020. The report concluded that all intersections within the study area are forecast to operate with high levels of service up to and including a 2025 build-out schedule and no improvements to the existing transportation network are therefore anticipated to support the development.

DEVELOPMENT ENGINEERING (LONDON) LIMITED

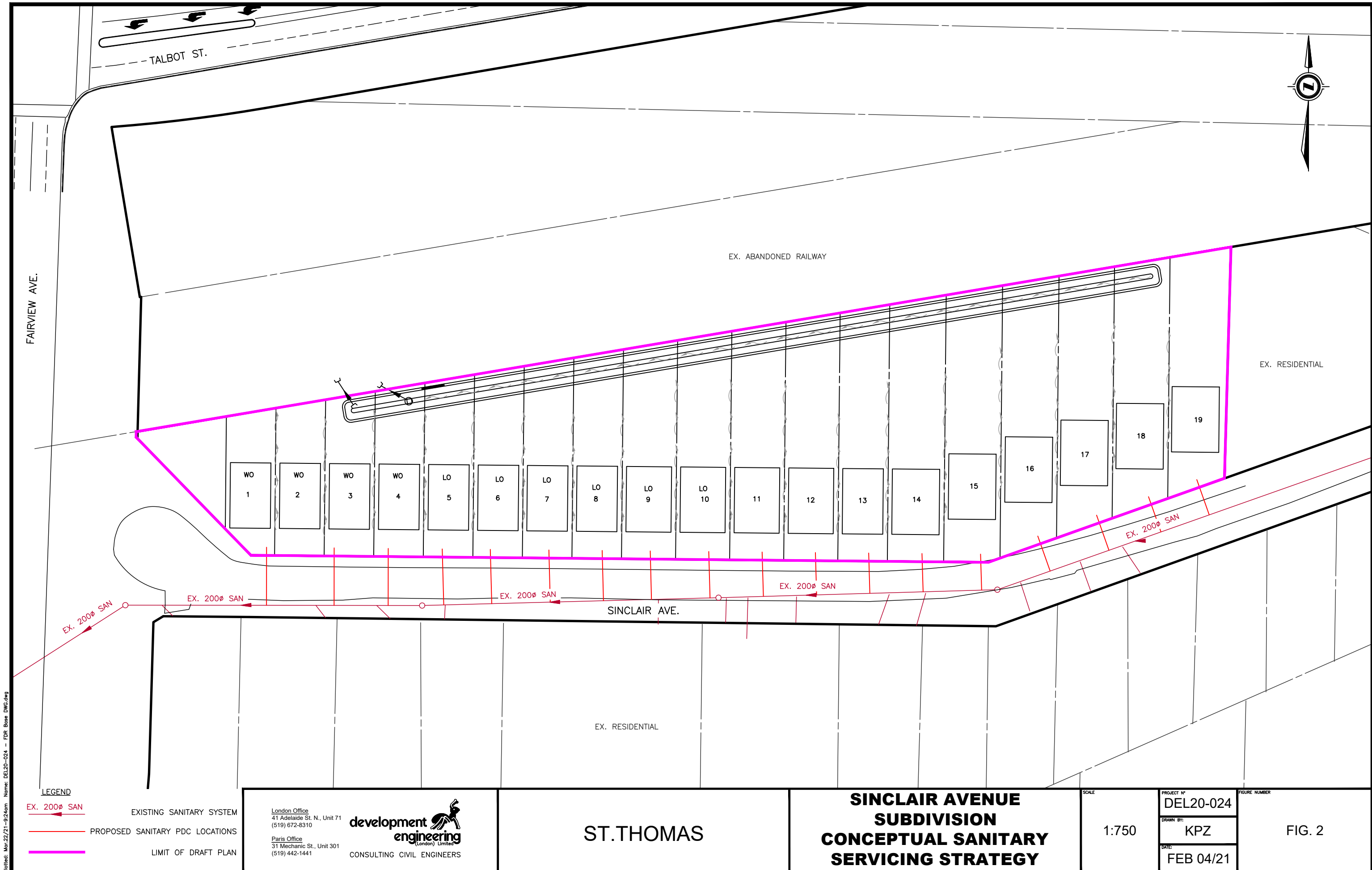


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APPENDIX

- **Figure 2 – Conceptual Sanitary Servicing Strategy**
- **Figure 3 – Conceptual Water Distribution**
- **Figure 4 – Conceptual Storm Servicing Strategy**



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LEGEND

EX. 200Ø SAN

EXISTING SANITARY SYSTEM

PROPOSED SANITARY PDC LOCATIONS

LIMIT OF DRAFT PLAN

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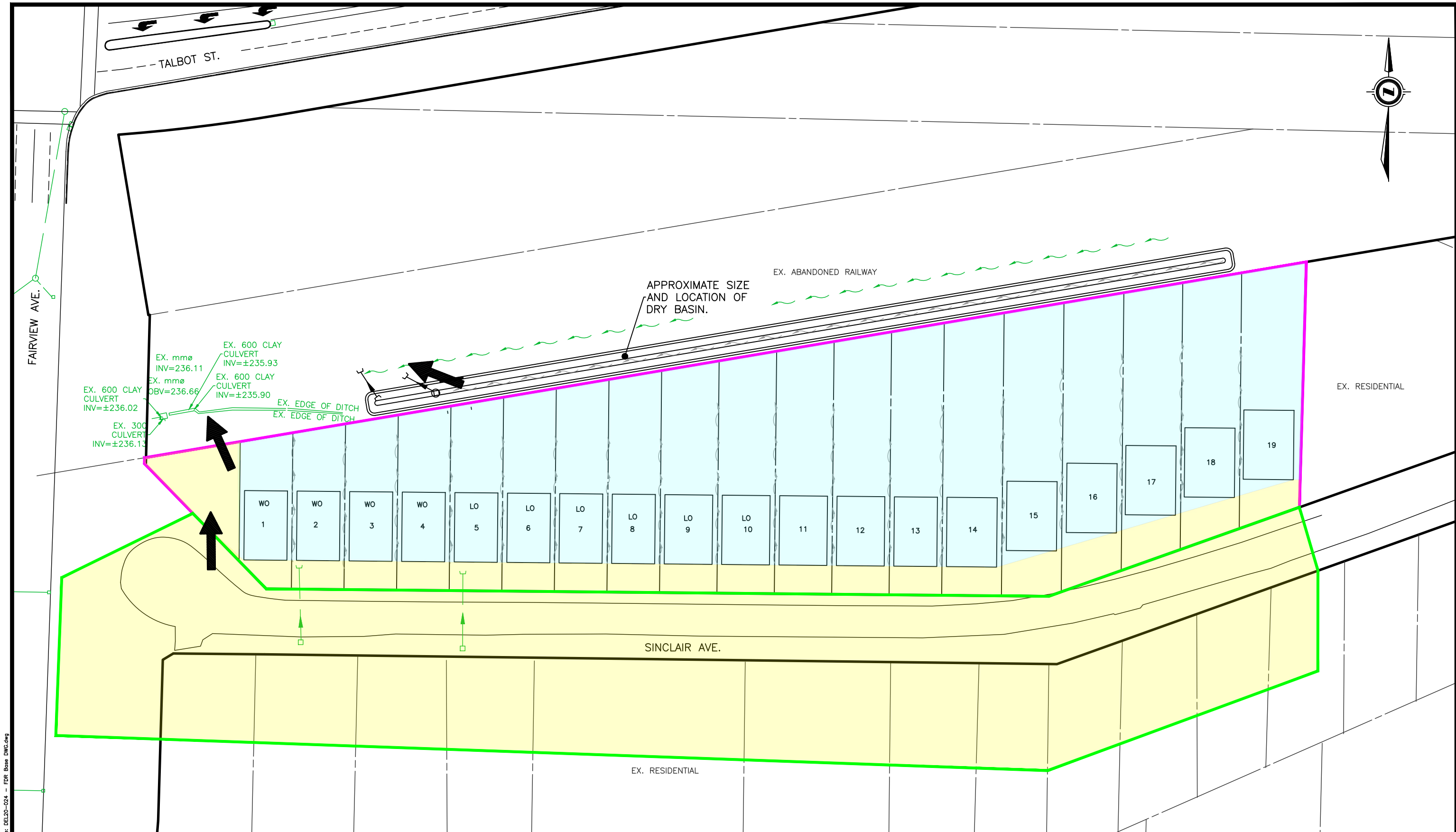
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CONSULTING CIVIL ENGINEERS

ST. THOMAS

SINCLAIR AVENUE
SUBDIVISION
CONCEPTUAL SANITARY
SERVICING STRATEGY

SCALE 1:750	PROJECT N° DEL20-024	FIGURE NUMBER FIG. 2
	DRAWN BY: KPZ	
	DATE: FEB 04/21	



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