RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

VIA ELECTRONIC MAIL

Mr. Jason Fiorito
Pacific Raceways
31001 144th Avenue SE
Kent, WA 98042

PACIFIC RACEWAYS: PRELIMINARY ASSESSMENT OF POTENTIAL WATER QUALITY IMPACTS TO SOOSETTE CREEK AND BIG SOOS CREEK

Date September 5, 2017

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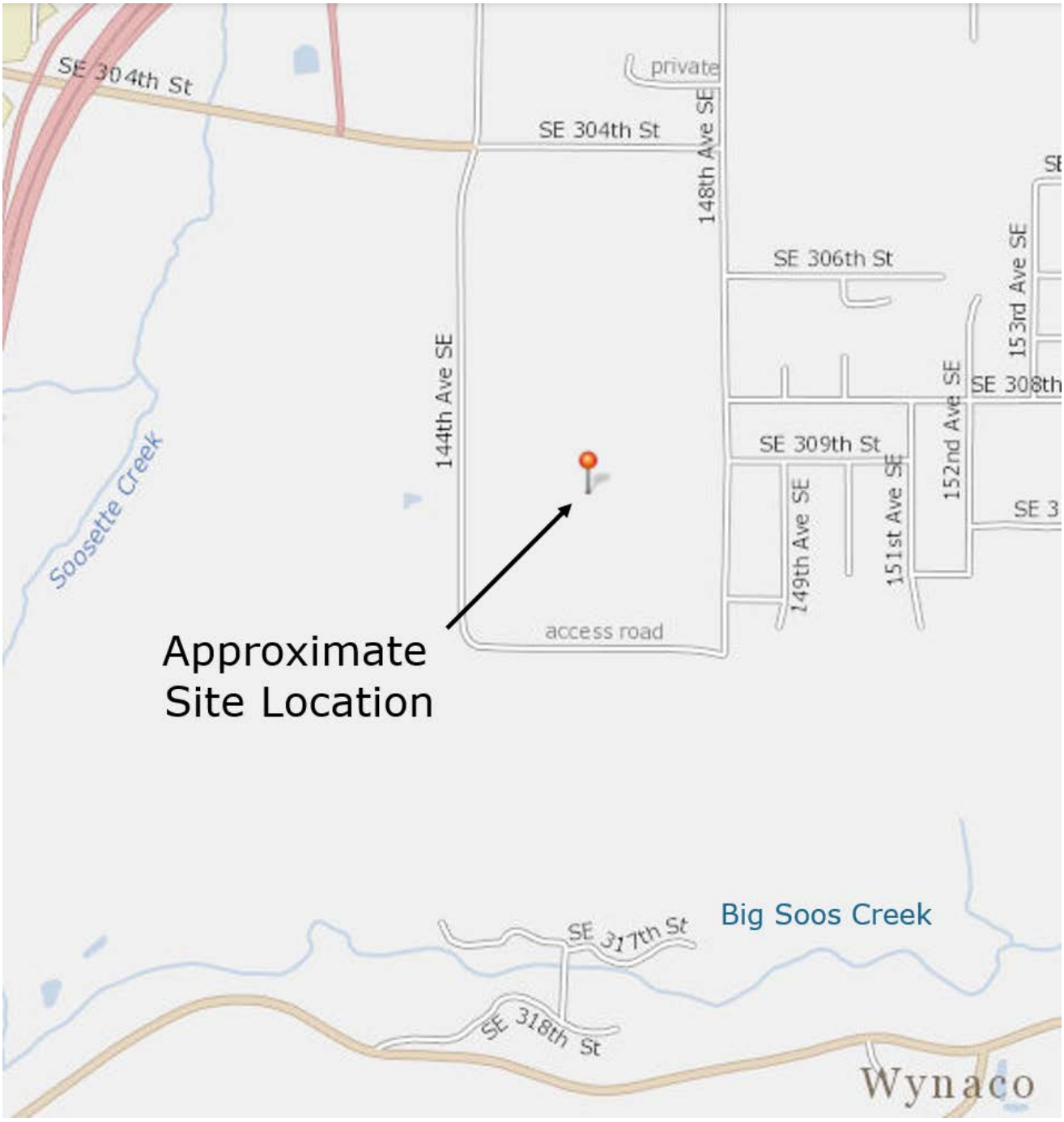
Dear Jason,

Pacific Raceways requested Ramboll-Environ to prepare this letter as a preliminary analysis of potential impacts of a proposed development at the Pacific Raceways site on water quality in Big Soos Creek and Soosette Creek. Ramboll-Environ understands that Pacific Raceways plans to expand their operation on a 40 acre parcel of land currently referred to as Parking Lot C (Figure 1 shows the approximate location of the Project site). Parking lot C is located over ¼ mile from slopes leading to Soosette Creek and has no sensitive areas. The shortest distance between the boundary of the Lot C development and either Soosette Creek or Big Soos Creek is approximately 2,000 ft. (0.37 mi.).

Attachment A presents a Preliminary Site Plan developed for the Project by ESM Engineering Consultants, LLC. The Project is presented in three phases and may include the Pacific Innovation Center with hobbyist garages and additional retail space. The Project will require design, construction, and operation of two water treatment systems with discharge to onsite soils: an onsite septic system (OSS) for domestic wastewater, and a stormwater collection, treatment and infiltration system for impermeable surfaces including roofs, roadways, and parking areas. Given the early stages of planning for the Project, preliminary design of the treatment systems has not yet begun. The remainder of this letter presents a discussion of the general characteristics of the treatment systems and regulatory requirements, and preliminary conclusions regarding potential water quality impacts to Soosette Creek and Big Soos Creeks.



Note: Figure prepared using King County iMap (http://gismaps.kingcounty.gov/iMap/)

ONSITE SEPTIC SYSTEM

As part of the expanded operations, Pacific Raceways will add additional bathrooms and may add shower and laundry facilities. To treat wastewater from these additional sources, Pacific Raceways has begun the planning for an OSS. The preliminary locations of the septic tanks, drainfield, and reserve drainfield have been determined (see Attachment A). Soil percolation testing, selection of an OSS that is appropriate for the site, and sizing of the OSS are pending.

To build and maintain a functioning septic system, the OSS type must be appropriate to the type of soil that is present, which is determined in part via soil percolation testing. In a geological survey of the site, four soil types were named[1] which correspond approximately to soil textures defined as Types 1 through 4.[2] The Washington Department of Health lists several types of OSS systems that may be appropriate for this site. Table 1 presents a summary of OSS types for soil textures 1-4.

Table 1: OSS that are potentially viable and not recommended for soil types 1-4.

OSS Potentially Viable	OSS Not Recommended
Mound Systems (All Soil Types using pressure with timed dosing)	
Pressure Distribution Systems (All Soil Types with timed dosing)	
Subsurface Drip Systems (All Soil Types)	
Sand Lined Trench Systems (Appropriate for Soil Type 1 and other coarse soils)	
Recirculating Gravel Filter Systems (Soil Types 2-6 and soil type 1 given > 60 inches vertical separation)	
Dosing Gravity Drainfield Systems (Not allowed in Soil Type 1, allowed in Soil Type 2 with > 60 inches vertical separation)	
	Gravity Systems (Not typically allowed in Soil Type 1 soils)
	Intermittent sand filters (Recommended for Soil Types 2-6)
	Alternating Drainfields (Not recommended for Soil Types 1-3)

Source - Washington Department of Health: Recommended Standards and Guidance Documents
http://www.doh.wa.gov/CommunityandEnvironment/WastewaterManagement/FormsPublications#approved

[1] Letter from GeoResources to Mr. Jason Fiorito at Pacific Raceways dated January 24, 2017

[2] The following websites: https://soilseries.sc.egov.usda.gov/osdname.aspx and http://apps.leg.wa.gov/WAC/default.aspx?cite=246-272A-0220 were used to translate soil names into numbered textures used in King County OSS Program (http://www.kingcounty.gov/depts/health/environmental-health/piping/onsite-sewage-systems.aspx). The soil type "Old Borrow Area" was not found.

Once the appropriate type of OSS is selected, the size of the system must be determined by the flow of wastewater that will be produced. The amount of wastewater must be estimated based on the expected use of bathroom, shower, and laundry facilities. The *Washington Department of Health: Recommended Standards and Guidance Documents*[3] provides a method to determine the size of the system needed based on expected flow.

The OSS systems must also be constructed with appropriate access points for monitoring, inspection, pumping, and repair such as inspection ports in the drainfield and tank pump-out locations. Once constructed, Washington State OSS requirements (WAC 246-272A-0270[4]) outline how often systems need to be inspected and pumped. Pumping and inspection schedules are determined by flow levels, OSS size, and by the local health officer. Gravity systems must be inspected at a minimum once every 3 years, and pressure systems must be inspected every year. The owners can only use system additives that are specifically approved by the Washington State Department of Health, and can only introduce waste components that are typical of sewage from a residential source; runoff from garages or car washes cannot be put into the OSS system.

STORMWATER TREATMENT AND INFILTRATION SYSTEM

It is our understanding that the stormwater treatment and infiltration system will consist of three main elements: pre-treatment to remove debris, oil water separators, and a treatment train with infiltration. The King County Surface Water Design Manual (KCSWDM) provides Best Management Practices for infiltration systems, or "infiltration BMPs" (King County 2016a[5]).

- **Pre-treatment** – King County (2016a) requires installation of some form of pretreatment upstream of an infiltration BMP. This is to prevent the infiltration BMP from clogging by trash, debris, and suspended sediments present in stormwater runoff. Common pretreatment methods include cisterns, drain inlet inserts, oil/water separators (discussed separately below), proprietary settling/swirl chambers, and vegetated filter strips. It is important to note that many of these pretreatment techniques will require routine maintenance. Other practices typically considered to be primary BMPs, such as swales and green roofs, are also often used for pretreatment.
- **Oil/water separators –** Oil/water separators are appropriate for the Project due to the impervious surfaces being used for vehicular traffic and parking. Oil/water separators are also effective at further removing sand and grit from stormwater. Oil/water separators can be split into two categories: American Petroleum Institute (API) separators and coalescing plate separators (WEF, 2012). The API separators are a vault with baffles which enhance hydraulic efficiency. Coalescing plate separators use sloped plates or extruded tubes to achieve sediment and oil removal, and are smaller than the API structures. Oil-water separators are recommended in all cases where the main sources of the pollutants are driveways and parking lots, as is the case with the Pacific Raceways Project, and are required by King County (2016a).
- **Stormwater Treatment/Infiltration** – Once stormwater runoff is pre-treated, and trash/debris and oil is removed from stormwater runoff, the runoff is treated to improve water quality in the infiltration BMP facility. King County (2016a) requires compliance with an Enhanced Basic Water Quality Treatment, and with Special Requirement #5 (Oil Control for the high use site). The Enhanced Basic Water Quality Treatment requires installation of a water quality treatment train

[3] http://www.doh.wa.gov/CommunityandEnvironment/WastewaterManagement/FormsPublications#approved

[4] http://apps.leg.wa.gov/WAC/default.aspx?cite=246-272A-0270

[5] King County. 2016. King County, Washington Surface Water Design Manual. King County Department of Natural resources and Parks April 24, 2016.

consisting of two water quality treatment facilities: the first facility could be (a) proprietary media or membrane filter, such as Contech StormFilter with ZPG™ media, and (b) a Basic Sand Filter, designed as an infiltration trench (King County 2016a; Table 6.1.2.A). It is our understanding that the design Project engineer proposes to use StormFilter, an underground infiltration trench treatment train, so that the Enhanced Basic Water Quality Treatment requirements will be met by the proposed design.

STORMWATER POLLUTANT REMOVAL EFFICIENCY

Pollutant removal efficiency will depend on the final Project design. Design elements include the type of the oil/water separator to be used, storm-filter media selected for the Contech StormFilter, design of the infiltration gravel trench, and maintenance of each facility once they are constructed. Details of the engineering design are not known at this time, therefore the following pollutant removal efficiencies have been computed for the Project based on our preliminary understanding of Project details:

- **Oil Water Separator** – If the API oil-water separator is used, all oil droplets greater than 150 microns will be removed.[6]
- **Contech StormFilter** – If the Project design uses the ZPG™ filter media (the only one approved by King County 2016a), sufficiently high pollutant removal of TSS (over 80 percent, and accepted by King County 2016a) can be achieved (and confirmed with King County and Department of Ecology removal efficiency tests).[7] The StormFilter also is designed to remove soluble metals, phosphorus, and other fine particles; however the removal efficiency is highly variable. It is expected that all larger oil droplets will be removed in the oil-water separators, prior to entering the stormwater treatment train. The 80 percent removal rate of TSS satisfies the KCSWDM Enhanced Basic Water Quality Treatment requirement.
- **Infiltration Trench** – Pollutant removal efficiency in the infiltration trench can be highly variable, but the trench will in general remove pollutants not previously removed by the StormFilter, such as fine sediments, bacteria, organics, trace metals, and nutrients. However, maintenance of the infiltration trench will be required to keep it from getting clogged by fine-grained sediment. It is also essential to design the bottom of the trench well above the seasonally high groundwater to prevent potential contamination of the groundwater. The KCSWDM guidelines specifically discourage use of the infiltration trench in areas with high groundwater. As the proposed infiltration system is situated 7 feet above historically high perched groundwater, the use of the infiltration trench on the Project is appropriate.

MAINTENANCE OF STORMWATER FACILITIES

The proposed treatment facilities will need to be maintained at regularly scheduled frequency (usually prescribed by manufacturer), and after flood events where flood overflow may bring additional sediments and pollutants into the system. This is necessary to assure satisfactory pollutant removal on a continuous basis.

The KCSWDM guidelines recommend that both pre-treatment and treatment facilities should be inspected every six months during the first year of operation, and immediately following any storm events. Once treatment devices are performing as designed, the inspection/maintenance frequency may be reduced to

[6] API Oil Water Separators http://panamenv.com/wp-content/uploads/API-OIL-WATER-SEPARATOR-DISCUSSION-2013.pdf, accessed 08/2017.

[7] Contech Engineered Solutions, http://www.conteches.com/products/stormwater-management/treatment/filter-media-options.aspx, accessed 08/2017.

every year. The specific maintenance considerations from King County (2016a) pp. 6-116 to 6-117 should be followed.

BEST MANAGEMENT PRACTICES FOR POLLUTION PREVENTION

The degree of environmental protection offered by the OSS and stormwater treatment and infiltration systems depends in large part on the effectiveness of preventing or minimizing the introduction of pollutants into the system, including hazardous materials and oils. This will require that the facility develop an environmental management plan with specific best management practices that includes diligent implementation, training, and monitoring. King County (2016b)[8] provides outlines for best management practices, several of which may be applicable to the Pacific Raceways proposed development, including the following (depending on the specific activities that will occur):

- A-1 Required Best Management Practices for all Properties with Commercial Activities
- A-2 Outdoor Storage of Liquid Materials in Stationary Tanks
- A-3 Storage of Liquid Materials in Portable Containers
- A-9 Storage of Scrap and Recycling Materials (Including Auto Recycling Facilities)
- A-10 Treatment, Storage, or Disposal of Dangerous Wastes
- A-11 Cleaning or Washing of Tools and Equipment
- A-13 Vehicle Washing and Steam Cleaning
- A-14 Interior Washing Operations
- A-17 Stationary Fueling Operations
- A-18 Vehicle and Equipment Repair and Maintenance
- A-22 Painting, Finishing, and Coating of Vehicles, Products and Equipment
- A-31 Vehicle and Equipment Parking and Storage
- A-40 Street Deicing Operations

In addition to these BMPs, Washington Department of Ecology may require development of a spill response and clean-up plan and stocking of appropriate spill kits.

OPINION STATEMENT

OSS

An OSS is a time-tested and effective means of treating domestic sewage. The system generally includes two components: a multi chambered tank for solids settling and decomposition by bacteria, and a drainfield for disposal and treatment of effluent via natural aerobic degradation of nutrients, dissolved organic matter, and other constituents. The objective of the drainfield is to allow effluent to percolate sufficiently slowly through soil so as to ensure adequate treatment by naturally occurring bacteria and physical processes prior to the effluent reaching groundwater or surface waters. The Washington State Department of Health website asserts that "A properly functioning septic system helps remove these pollutants so well water and nearby surface water doesn't get contaminated". In other words, if an OSS is properly designed, sited, installed, operated and maintained it is expected to be protective of groundwater.

Evidence that this premise is universally accepted is provided by general guidelines concerning the location of drinking water wells relative to the location of an OSS. Numerous authorities including the Centers for Disease Control, the Groundwater Protection Council, and state health departments and departments of the

[8] King County. 2016b. Stormwater pollution prevention manual—Best practices for commercial, multi-family, and residential properties. King County Department of Natural Resources and Parks, Water and Land Resources Division, Stormwater Services Section. http://your.kingcounty.gov/dnrp/library/water-and-land/stormwater/stormwater-pollution-prevention-manual/2016_Stormwater_Pollution_Prevent_Manual.pdf Accessed August 7, 2017.

environment provide guidance or requirements on such setbacks. For example, the Washington Administrative Code (WAC 173-160-171) requires that drinking water wells be located a minimum of 100 feet from the edge of an OSS drainfield. Such guidance and regulations acknowledge that OSS systems are inherently protective of groundwater.

At the Project location, the OSS will be located at least 2,000 feet from either Soosette Creek or Big Soos Creek, allowing for a significant additional buffer area. Because the OSS is expected to be protective of groundwater at the Project location, it is our opinion, then, that by extension, the system also will be protective of water quality in Soosette Creek and Big Soos Creek. This opinion is based on the premise that the OSS is properly designed, installed, operated, and maintained, including implementation of BMPs to prevent the introduction of hazardous substances and oil into the system.

Stormwater Treatment and Infiltration System

A stormwater treatment and infiltration system that includes the above elements is a time-tested and effective way for treating stormwater from a project such as the Pacific Raceways development. In particular, King County (2016a, Section 5.2.1) *General Requirements for Infiltration Facilities* is intended to ensure that infiltration facilities do not result in pollution of groundwater. It is our understanding that the Project engineer proposes to design and construct an oil water separator (removing oil), standard catch basin inserts (for removal of trash debris), and an infiltration treatment train (consisting of Contech Stormfilter with ZPG media, and of an infiltration trench). The treatment train will have to satisfy rigorous King County enhanced protection criteria for pollutant removal, and it is expected to remove fine sediments, bacteria, organics, trace metals, and nutrients. This system also will be required to be maintained in accordance to installers' and manufacturers' specifications and applicable King County and state guidance and regulations. Therefore, the infiltration system as currently described in preliminary design documents and other correspondence, and as specified by King County (2016a), is expected to be protective of groundwater so long as it properly designed, installed, operated, and maintained, including implementation of BMPs to prevent the introduction of hazardous substances and oil into the system.

At the Project location, the infiltration system will be located at least 2,000 feet from either Soosette Creek or Big Soos Creek, allowing for a significant additional buffer area. Because the stormwater infiltration system is expected to be protective of groundwater at the Project location, it is our opinion, then, that by extension, the system will also be protective of water quality in Soosette Creek and Big Soos Creek.

Yours sincerely,

Pieter Booth
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ATTACHMENT A
ESM CONSULTING ENGINEERS, LLC PRELIMINARY SITE PLAN

A PORTION OF SEC. 10, T 21 N, R 5 E, W.M.

BUSINESS PARK

n

SCALE: 1" = 200'

200 100 0 200 400

VICINITY MAP

NTS

SITE INFORMATION

OWNER/DEVELOPER:	PACIFIC RACEWAYS, INC. 31001 144TH AVE. SE KENT, WA. 98042 (253) 639-5927
ENGINEER AND LAND SURVEYOR:	ESM CONSULTING ENGINEERS 33400 8TH AVE S, SUITE 205 FEDERAL WAY, WASHINGTON 98003 (253) 838-6113
EX. ZONING:	INDUSTRIAL/ RA-5
SEWAGE DISPOSAL:	ON-SITE SEPTIC
WATER SUPPLY:	COVINGTON WATER DISTRICT
FIRE DISTRICT:	KING COUNTY FIRE DISTRICT NO. 44
SCHOOL DISTRICT:	AUBURN #408
SITE ADDRESS:	31001 144TH AVE SE KENT, WA 98042
PARCEL NUMBERS:	1021059003
SITE AREA:	42.17 ACRES
AREA OF DISTURBANCE/ DEVELOPMENT	40.63 ACRES

BUILDINGS

BUSINESS/GARAGE BUILDINGS – 196,000 S.F.
RETAIL BUILDINGS – 4,000 S.F.
TOTAL – 200,000 S.F.

Sheet Index

REVISIONS

NO.	DESCRIPTION/DATE	BY

ESM CONSULTING ENGINEERS, LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003
FEDERAL WAY (253) 838-6113
EVERETT (425) 297-9900
www.esmcivil.com
Civil Engineering
Public Works
Land Planning
Landscape Architecture
Land Surveying
Project Management

PACIFIC RACEWAYS

BUSINESS PARK

COVER SHEET

KING COUNTY WASHINGTON

JOB NO.:	1263-002-016
DWG. NAME:	CV-01
DESIGNED BY:	TLS
DRAWN BY:	CJR
CHECKED BY:	
DATE:	06/01/2017
DATE OF PRINT:	

CV-01

1 OF 4 SHEETS

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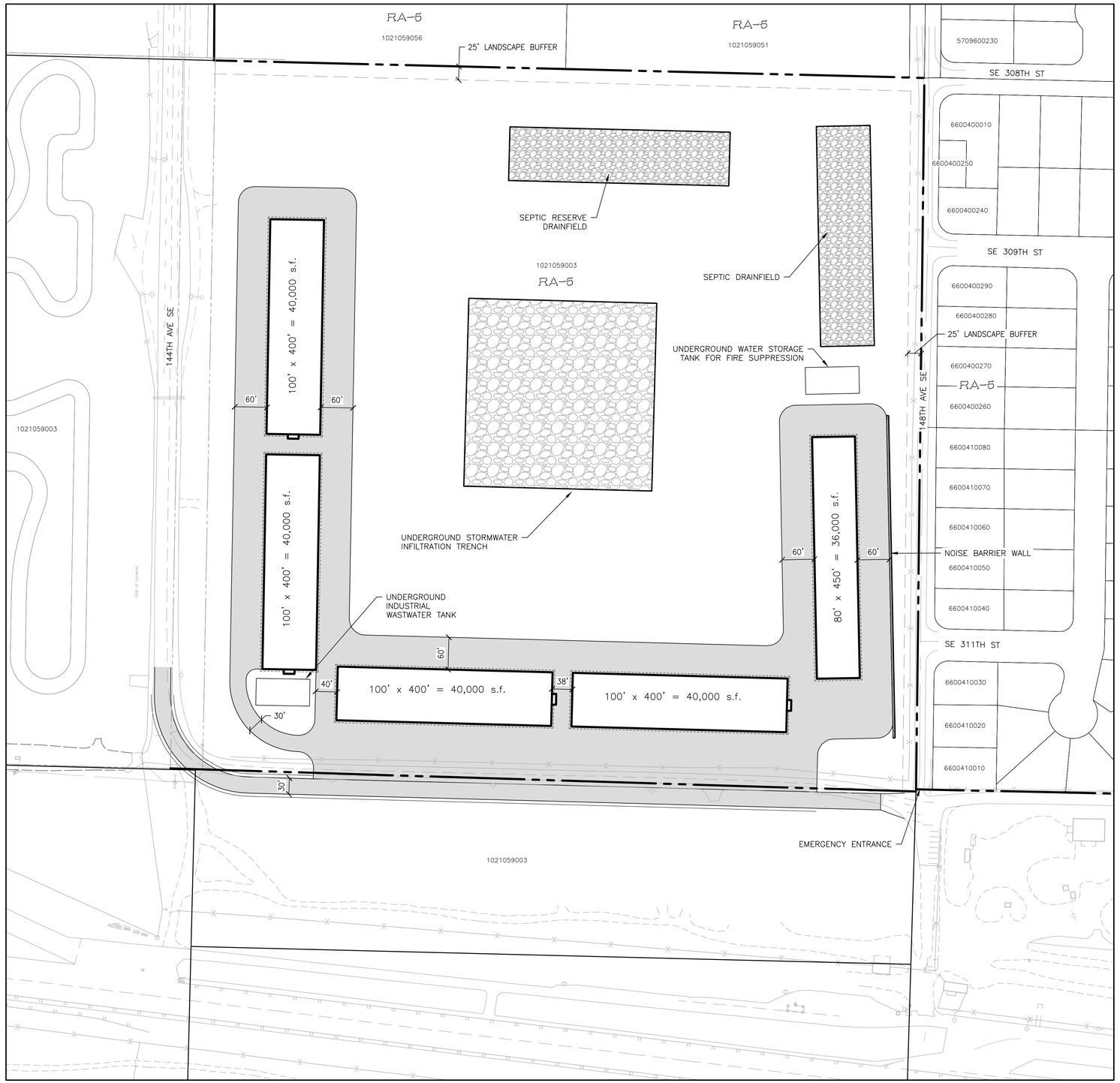

SITE PLAN
SCALE: 1"=100'

n

SCALE: 1" = 100'
100 50 0 100 200

REVISIONS

NO.	DESCRIPTION/DATE	BY

CONSULTING ENGINEERS, LLC
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Civil Engineering | Land Surveying | Land Planning
Public Works | Project Management | Landscape Architecture

PACIFIC RACEWAYS

BUSINESS PARK

PRELIMINARY SITE PLAN

KING COUNTY WASHINGTON

JOB NO.:	1263-002-016
DWG. NAME:	ST-01
DESIGNED BY:	TLS
DRAWN BY:	CJR
CHECKED BY:	
DATE:	06/01/2017
DATE OF PRINT:	

ST-01

2 OF 4 SHEETS

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