

ENTRIX

ENVIRONMENTAL CONSULTANTS

***INTERIM REMEDIAL ACTION WORK PLAN #2
For
THREE KETTLE BOTTOMS IN WORK AREAS 1 AND 2***

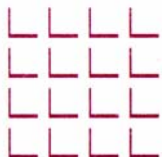
Prepared for Submittal to:
Washington State Department of Ecology
Southwest Region Toxics Cleanup Program

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**INTERIM REMEDIAL ACTION WORK PLAN
BRIGGS NURSERY, INC.
OLYMPIA, WASHINGTON**

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1.0 INTRODUCTION

The Briggs Nursery site (Site) is located in the City of Olympia in Thurston County, Washington near the intersection of Yelm Highway and Henderson Boulevard SE, in Sections 35 and 36, Township 18 North, Range 2 West, latitude 47°00'19"N, longitude 122°53'06"W (Figure 1). The Site is currently under development as a residential village.

The Site has been divided into three Work Areas. Work Area 1 lies mostly west of Henderson Boulevard (a small portion of Work Area 1 lies at the southern extent of the Site east of Henderson Boulevard). Work Area 2 is the portion of the Site nearer the west side of Henderson Boulevard. Work Area 3 is east of Henderson Boulevard (Figure 1).

There are six bowl-shaped depressions or kettles that are either wholly or partially situated on the Site. These kettles are remnant geologic features from the region's last glacial episode¹. They are important drainage features on the Site. Over many years, stormwater and irrigation runoff from the Site, adjoining roads, and residential properties have been diverted into some of the kettles. The kettles have been the focus of some of the Site investigations.

In previous reports, the kettles have been named based on their location on the Site and this nomenclature is retained here. The South Kettle lies in the southwestern portion of the Site. It has a small seasonal pond. The Central Kettle occupies a large proportion of the central portion of the Site west of Henderson Boulevard. A large pond has historically occupied the bottom of the Central Kettle. To the north lies the Northwest Kettle, which has a small pond on its western edge. The North Kettle is east of the Northwest Kettle and is the smallest kettle. It is not known to have standing water. The Northeast and Southeast Kettles lie east of Henderson Boulevard.

A Remedial Investigation/Feasibility Study (RI/FS) was conducted at the Site (ENTRIX 2006²) under Agreed Order 1315 with the Washington State Department of Ecology (Ecology). The human health risks associated with upland Site contaminants in Work Areas 1 and 2 were addressed by an initial Interim Remedial Action (IRA) conducted in 2005³.

A baseline human health risk assessment (HHRA) was conducted for the kettle bottoms in Work Areas 1. These HHRA's addressed the potential risks associated with polychlorinated dibenzodioxins and -furans (PCDD/Fs), which are found in the waters and sediments in the kettle bottoms. For the risk calculations, the HHRA's assumed that the bottoms of the kettles in Work Area 1 will remain in their current state and that a residential exposure scenario is appropriate.

1 The kettles were created when stranded blocks of glacial ice gradually melted during the last glacial recession of the Puget Sound lobe over 12,000 years ago.

2 ENTRIX, Inc. 2006. Final Remedial Investigation/Feasibility Study for Work Areas 1 and 2; Briggs Nursery, Inc.

3 The area east of Henderson Boulevard, including the Northeast and Southeast Kettles, will be addressed in a later study.

The assessments are summarized in Section 9.0 of the Final RI/FS and conclude that:

- The sediments of the North Kettle bottom pose no unacceptable risks to human health;
- The sediments and waters of the Northwest Kettle bottom may pose an unacceptable risk to human health;
- The sediments and waters of the Central Kettle bottom may pose an unacceptable risk to human health; and
- The sediments and waters of the South Kettle bottom may pose an unacceptable risk to human health.

The risk assessments also concluded that ecological risks associated with the sediments and waters of these four kettle bottoms are within acceptable limits under MTCA, and no further action is necessary to address them.

As a result of these conclusions, the feasibility study (FS) considered options for addressing the human health risks associated with the sediments and waters of the Northwest, Central, and South Kettles as part of a Site IRA. This document is based on that FS and provides a work plan for IRA activities designed to protect human health with respect to the risks posed by these three kettle bottoms.

2.0 FEASIBILITY STUDY

2.1 INTRODUCTION

The human health risks in the Site kettles in Work Area 1 were addressed in the FS, in which two IRA alternatives – A and B – were considered. In summary, the HHRAs for these alternatives determined that:

- Alternative A – Institutional controls without fencing failed to adequately reduce risks to human health in all three kettles.
- Alternative B – Institutional controls that include fencing reduced exposure to sediments and waters of these kettles to a sufficient degree so that they pose no unacceptable risks to human health under a residential scenario.

Alternative B was determined to be the most appropriate action in order to protect human health in the kettle bottoms.

2.2 ALTERNATIVE B – RESTRICTIVE COVENANTS, WARNING SIGNS, AND FENCES

The restrictive covenant is an instrument that provides Ecology with a means to ensure that the kettle bottoms will be used in a way that does not pose a threat to human health or the environment. Its conditions and restrictions run with the land.

The restrictive covenant requires that:

- The kettle bottoms not be used for any industrial, commercial, or residential activity other than those uses approved in advance by Ecology.
- Public access to the kettle bottoms shall be prohibited.
- The kettle bottoms be enclosed by fence and signed.

Exhibit B of the restrictive covenant describes the fencing and signage to be installed. The use of fence to restrict human access to certain hazardous areas is consistent with guidance and regulations from Washington State and its municipalities, counties, and industries. These areas include:

- Swimming pools,
- Solid waste, hazardous waste, and composting facilities,
- Electrical substations, and
- Nuclear waste facilities.

Refer to Appendix K of the Final RI/FS for an evaluation of the requirements for fences in these circumstances. In summary, that evaluation determined that the protection afforded by a chain-

link fence six feet in height is consistent with the level of risks – both physical and chemical – that each of the three kettle bottoms present to human health.

3.0 CONSTRUCTION

3.1 CONSTRUCTION OF FENCING

A permanent fence will be installed around the South, Central, and Northeast Kettles. Permanent fencing is defined here as chain-link mesh fencing that is built of durable materials and designed to last 25 to 30 years or more. The chain-link mesh fabric, fence posts, framework, fittings, tension wires, and gates of the fences will be consistent with general specifications for commercial and industrial applications⁴. The following general specifications are required for the fences:

- A minimum of six feet in finished height
- Galvanized 1-3/4” to 2-3/8” diamond size chain-link mesh
- A knuckled upper selvage (finished edge) on the chain-link mesh
- Both top and bottom tension wires
- No barbed wire
- Two eight-foot lockable swing gates in each kettle’s fence, in locations that provide access by vehicles and workers to various portions of each kettle

The fences will be installed on the side slopes of the Kettles at an elevation at least three feet above the estimated mean high water line (Figures 2, 3, and 4). These elevations are based on review of the available information about the kettles, in collaboration with the Ecology Site Manager. The estimated footage and minimum elevation of the installed fencing required for each kettle are summarized in the table below. The planned locations of the fences will be verified and located in collaboration with the Ecology Site Manager, and the fences will be surveyed after their installation.

Kettle	Estimated Elevation (ft)	Estimated Length (ft)
South Kettle	120	1000
Central Kettle	130	2000
Northwest Kettle	135	1500

⁴ For example, ASTM Standard F1553-01 “Standard Guide for Specifying Industrial and Commercial Chain Link Fence” may be used as guidance to provide design specifications.

Other factors for construction of the fencing will include topography and soil type. The contractor is required to install the fence at an elevation *at least as high as* specified in this work plan for a given kettle, but is *not* required to follow the exact elevation contour for a given kettle. The lay of the land may be taken into account wherever possible for efficient fence construction.

The slope, soil composition, and soil stability will determine post placement and installation method(s). Where possible, braces will be located in firm soil. The contractor will need to account for possible soil erosion on steeper slopes and its effects on the fence.

Signs (as described in detail in Exhibit B of the Restrictive Covenant) will be placed at intervals no greater than 50 feet around the perimeter of the fence, and be displayed at a height of four (4) feet above ground surface. The signs will be permanently attached to the outside of the fence fabric.

The swing gates installed in each kettle are to allow for future vehicular and pedestrian access for the maintenance of the kettles and their fences.

3.2 HEALTH AND SAFETY

The construction contractor will provide a health and safety plan (HASP) in accordance with applicable OSHA guidelines for all work activities on the Site. Work activities will be conducted on the side slopes of the Kettles; therefore, construction workers will not be directly exposed to the PCDD/Fs in sediment or water of the kettle bottoms. The risks associated with accidental exposures by workers to the water and sediment are not significant⁵. Standard industrial hygiene will be practiced while working in the kettles. This includes wearing long-sleeved shirts, long pants, and boots. If any accidental contact is made with sediments or water, workers will leave the kettle and wash the skin area with clean water and soap prior to returning. A suggested approach is that work parties have small pump sprayers containing soapy and clear tap water for this purpose.

At least one person who is current in 40-hour general site worker and 8-hr supervisor HAZWOPER training will be present during construction to ensure that all work activities are completed properly and safely. Work activities will be documented in a written log (including photographs) to demonstrate that construction was conducted in accordance with the Site-specific HASP.

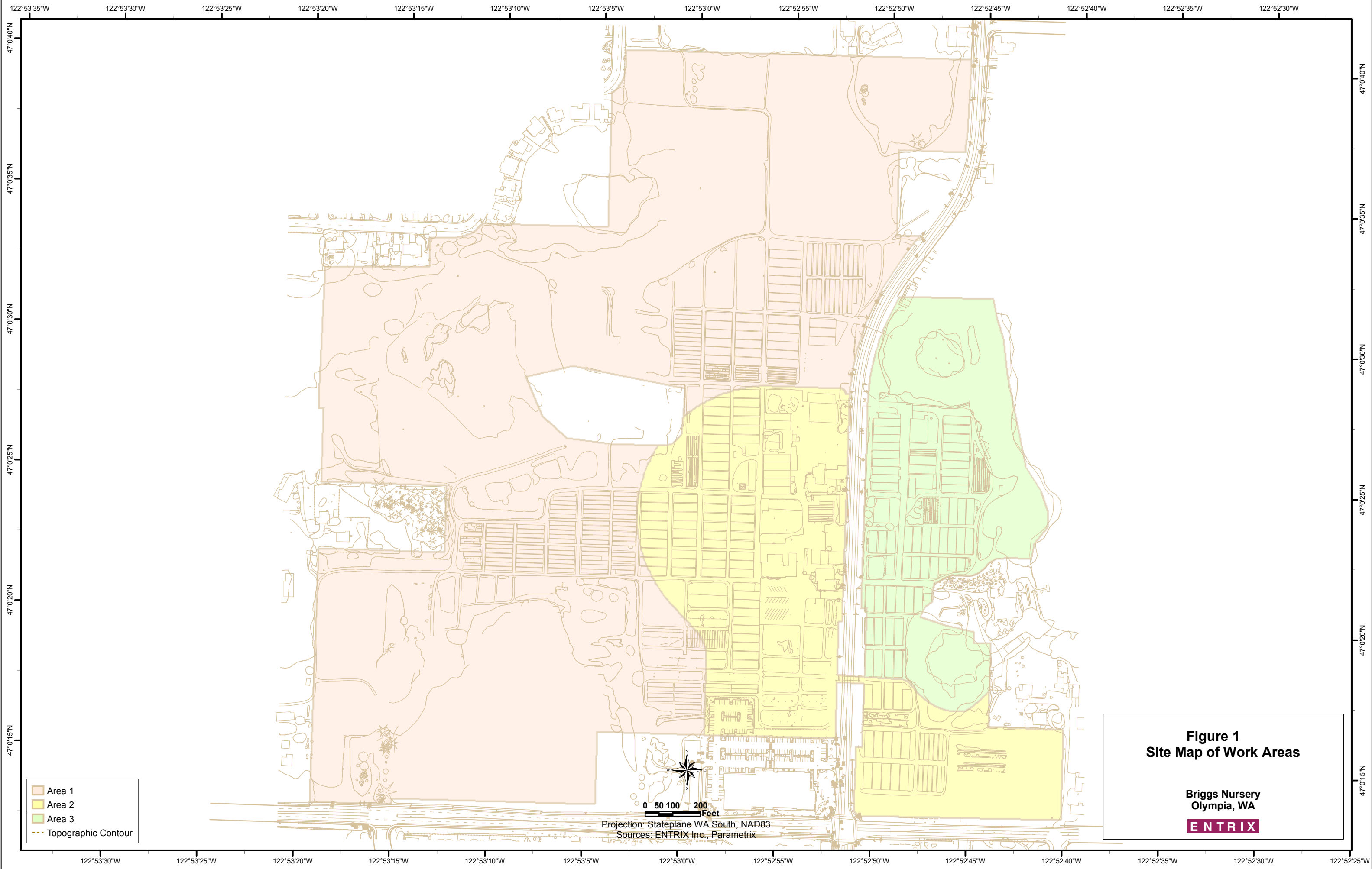
⁵ Assuming that a worker installing fencing accidentally gets water and mud on the skin and waits an hour before washing it off, the incremental risk lifetime cancer risk associated with one such incident, based on the sediment and water concentrations used in the HHRA for the Briggs Nursery Site (Intertox 2006), is estimated to be less than 1 in 10,000,000 (1×10^{-7}). The applicable MTCA standard is 1×10^{-6} , or more than one-tenth the conservative risk estimate.

Figure 1. Insert Site Vicinity Map

Figure 2. Insert South Kettle

Figure 3. Insert Central Kettle

Figure 4. Insert Northwest Kettle



- Area 1
- Area 2
- Area 3
- Topographic Contour



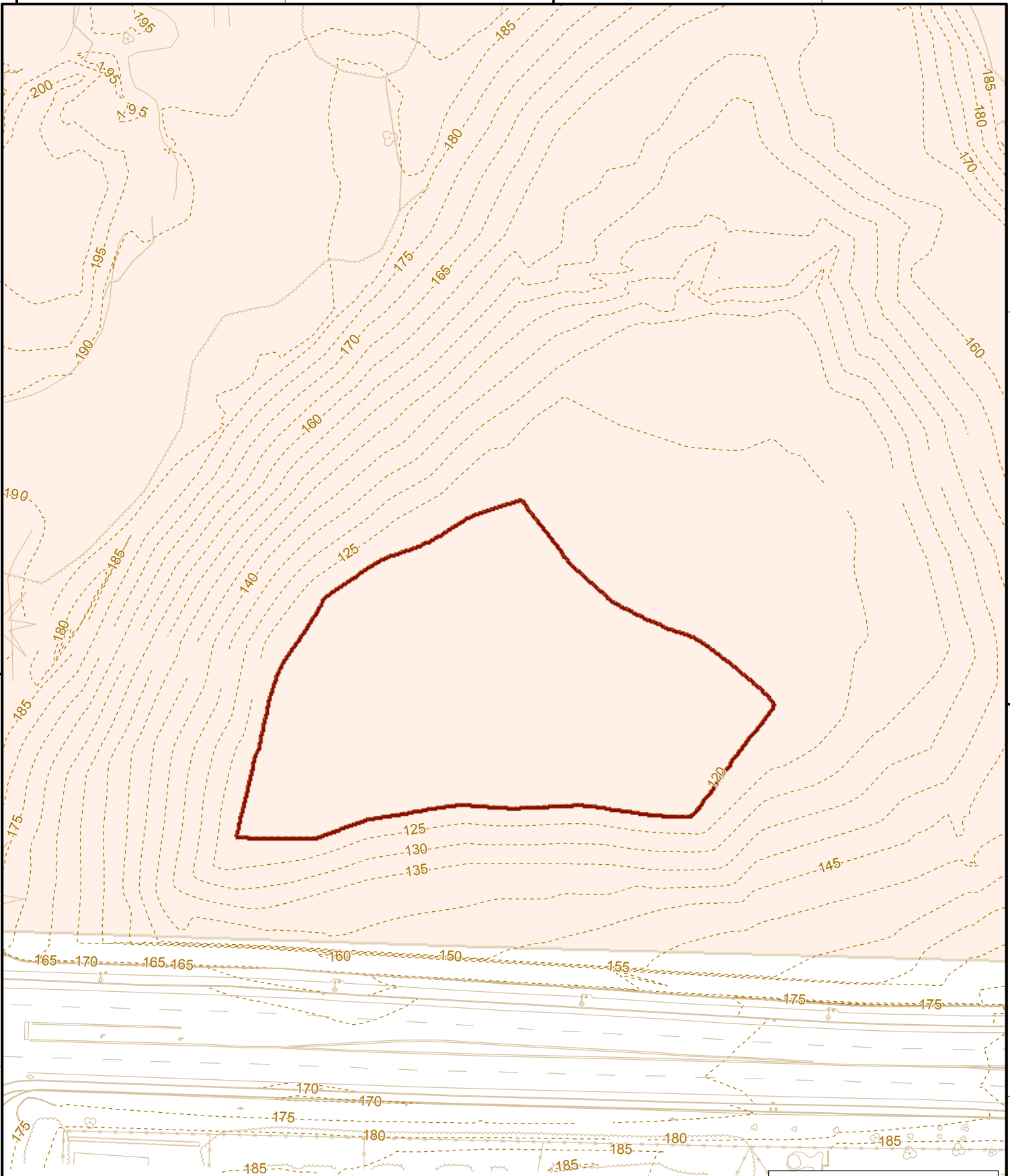
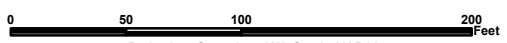

 0 50 100 200 Feet
 Projection: Stateplane WA South, NAD83
 Sources: ENTRIX Inc., Parametrix

Figure 1
Site Map of Work Areas

 Briggs Nursery
 Olympia, WA




- Area 1
- Area 2
- Area 3
- Topographic Contour
- Proposed Fencing



Projection: Stateplane WA South, NAD83
Sources: ENTRIX Inc., Parametrix

Figure 2
Minimum Fence Elevation
South Kettle

Briggs Nursery
Olympia, WA

ENTRIX

122°53'15"W

122°53'10"W

47°0'30"N

47°0'30"N

47°0'25"N

47°0'25"N

122°53'15"W

122°53'10"W

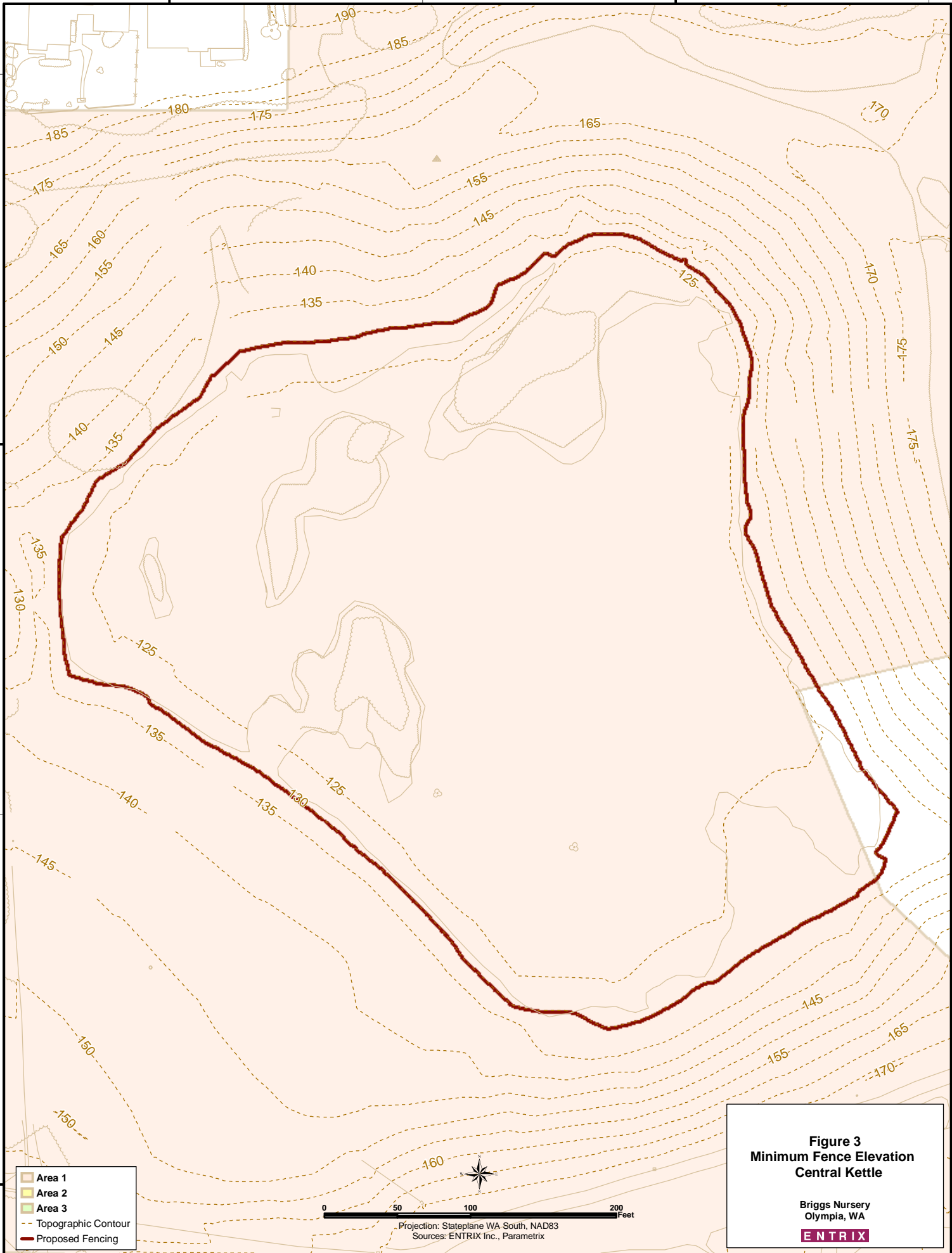


Figure 3
Minimum Fence Elevation
Central Kettle

Briggs Nursery
 Olympia, WA





Figure 4
Minimum Fence Elevation
Northwest Kettle

Briggs Nursery
Olympia, WA



Projection: Stateplane WA South, NAD83
Sources: ENTRIX Inc., Parametrix

- Area 1
- Area 2
- Area 3
- Topographic Contour
- Proposed Fencing