KLEIN PROPERTY – CITY OF BLAINE, WASHINGTON

ADDENDUM TO WETLAND REPORT & MITIGATION PLAN

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6 September 2010

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Addendum to WETLAND REPORT & MITIGATION PLAN

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1.0 INTRODUCTION

At your request, PE Consultants LLC has prepared this report as an addendum to the 23 November 2008 Wetland Report and Mitigation Plan and the 27 March 2009 response letter to City of Blaine comments. This report addresses changes to the site plan that include the expansion of parking area for Buildings C1 and C2 and for an internal road connecting Yew Avenue to O'Dell Road.

This report analyzes impacts of this project propose an amended Wetland Report and Mitigation Plan on the approximately 45 acre subject property (400106 530277 0000, 400106 487260 0000, 400106 508255 0000, 400106 430178 0000, 400106 465259 0000, 400106 419225 0000, 400106 511105 0000, 400106 530273 0000, 400106 531255 0000, and 400106 531245 0000) located off Pipeline Road and Yew Avenue, City Blaine, Whatcom County, Washington in Section 06, Township 40, Range 01E, Willamette Meridian (**Figure 1**). This is a conceptual mitigation plan for which a detailed plan, including grading plan and hydrology details, may be prepared upon approval of this report. This report does not seek to replace the 23 November 2008 Wetland Report and Mitigation Plan, rather, this report addresses changes to the original site plan that will affect wetland impacts. Similarly, this report does not seek to replace the bald eagle plan. By implementing the proposed wetland mitigation plan, we believe that the project would increase functions of the low quality wetlands and have no adverse long-term impacts, as required by Chapter 17.83 of the City of Blaine Code.

A field reconnaissance was performed on 31 March 2008 to identify and field-locate potential wetlands present on the property or within 315 feet of the subject property. Observations were made of the general plant communities and the locations of potential wetland areas (See 23 November 2008 Wetland Report and Mitigation Plan). Present and past land use practices were also noted, as were significant geological and hydrological features. Wetlands were formally delineated on 12 April 2008. In 2010, the northern portion of Wetland B had been delineated to determine impacts associated with the proposal for an internal access road connecting Yew Avenue to O'Dell Street. Existing conditions on the site are illustrated in **Figures 2-4**.

Methodology of the study can be found in 23 November 2008 Wetland Report and Mitigation Plan.

2.0 PURPOSE

The purpose of this report is to evaluate the direct or indirect, short-term or long-term impacts of this project in reference to the proposed site plan changes and the wetland mitigation plan. This report recommends on-site mitigation of wetlands and buffer zones to compensate for unavoidable wetland fill necessary for development on this highly disturbed site. The proposed project is impacting wetlands of a generally lesser quality in favor of creating and enhancing wetlands of a higher quality and habitat function. This report provides specifications for planting, as well as for the installation of habitat features that would increase the structural diversity of wetland and wetland buffer functions for wildlife habitat.

3.0 PROJECT DESCRIPTION & IMPACTS

This report addresses changes to the Alternative A site plan prepared by Freiheit & Ho Architects Inc, P.S. and presented in the 23 November 2008 Wetland Report and Mitigation Plan. Because of the unusual shape and distribution of wetlands on the property unavoidable impacts are necessary to accomplish the general project goals and to achieve economical viability. The architects and I have explored a number of design options, considering avoidance and minimization of impacts to wetland. However, considering the operational and functional practicality of the general project purpose and also considering compliance with Blaine design standards, no other practical alternative was considered that would avoid wetlands and buffer impacts beyond the existing project design.

The proposed site plan utilizes three usable areas to place building footprints (**Figure 5**). Unavoidable permanent wetland impacts include a total of 145,228 sf in size. Mitigation shall occur at a 1.63:1 ratio, totaling the creation of 237,069 sf of a high quality wetland system. See **Table 2** for details. Buffer averaging and buffer enhancement will occur on the mitigation wetland improving buffer functions beyond degraded existing conditions (**Figure 6**). Pedestrian trails will be incorporated into the mitigation wetland to provide educational and social value to the wetland system, if required by the City of Blaine.

Table 2. Impacts and mitigation (See Figure 5)

Impact Polygon	Impact Area	Mitigation Polygon	Mitigation Area
Wetland A			
A1	8,740 sf	M1	10,333 sf
A2	9,465 sf	M2	22,160 sf
A3	28,980 sf	M3	12,810 sf
A4	5,740 sf	M4	13,780 sf
Totals Wetland A	52,925 sf		59,083 sf
Wetland B			
B1	17,037 sf	M5	50,580 sf
B2	75,266 sf	M6	74,632 sf
		M7	52,774 sf
Totals Wetland B	92,303 sf		177,986 sf
Total Wetland Impacts and 1.63:1 Mitigation Ratio			
Impacts		Wetland Mitigation	
145,228 sf (3.33 acres)		237,069 sf (5.44 acres)	

8.0 COMPENSATORY MITIGATION PLAN

The conceptual mitigation plan would improve wetland functions beyond existing conditions. Wetland A is a highly disturbed and degraded wetland that has a long history of human land use as a homestead property. The drainage through the wetland appears to have been straightened and ditched as a part of historical agricultural activities. Short European pasture grasses would be replaced by a variety of native tree, shrub, and herbaceous plant species improving the habitat value of this wetland system. Higher quality wetlands will be preserved to maximize wetland functions. Hydrological functions would be improved through the creation of wetlands that would increase the net size of on-site wetlands. Habitat value to nearby nesting bald eagles and to hawks and their prey would improve with the growth of trees and shrubs in Wetland A and its Buffer. Invasive weeds, such as Himalayan blackberry and Scotch broom would be eliminated and managed to further enhance the wetland and buffer mitigation areas.

This plan includes: 1) the creation of 237,069 sf high quality wetland, 2) the enhancement of 158,217 sf of wetland buffer through eliminating invasive weeds and planting native vegetation, and 3) the preservation of higher quality existing wetlands (**Figures 5 & 6; Table 2**). Unavoidable impacts would occur to periphery projections of wetlands that have moderately less value. Higher quality wetlands located in the central portion of the Wetland A corridor associated with the drainage will be preserved. This highly altered and disturbed wetland will be restored to its pre-existing higher quality condition as a part of this proposed project.

This mitigation plan will provide a visual screen between the wetlands and proposed land use. Wetland functions are expected to improve with the installation of two (2) bird houses, and two (2) bat boxes within the wetland and wetland buffer areas. Habitat diversity would be improved through the installation of habitat features in the wetland and the buffer that include placing a select number of downed logs over 12-inches in diameter on the forest floor, and/or by moving additional wood and downed woody debris into the created wetland and wetland buffer to improve wildlife habitat functions.

8.1 Wetland Creation

High quality wetlands will be created at a 1.63:1 replacement ratio to form large contiguous wetland habitats. The created wetlands will total 237,069 sf in size. Soils will be excavated to the grade of the existing Wetlands. Invasive weeds will be eliminated. Native plant species will be installed throughout the created wetland system to provide the maximum habitat diversity.

Create High Quality Wetlands

- Maximize wetland vegetation classes to improve wetland function
- Install habitat features, including snags, downed logs, bird houses, and bat boxes to encourage wildlife habitation, improve aesthetic qualities of the site, provide a method of insect control, and enhance habitat functions.
- Remove exotic invasive plants in the wetland buffer enhancement area through manual removal.
- Plant a variety of native plants in the wetland buffer, including shrubs, trees, and herbaceous vegetation to improve the quality and functions of the wetland.
- Use planting densities to that required by King County, as their standards have been widely adopted by local jurisdictions in Western Washington.
- Remove garbage and trash, including bottles, cans, paper, toys, appliances, car parts, and other disregarded items, from wetland and buffers.
- Place large woody debris in the wetland buffer to enhance habitat structural diversity.
- No stockpiling of soils will occur in wetlands or buffers, other than the created wetlands during the construction of the mitigation area.

Maximize Wetland Classes (Grading and Planting Plan)

The plan calls for the enhancement of created wetlands through maximizing vegetation classes. The grading plan in the mitigation area will be designed during the detailed construction phase to create areas of varying elevation and hydrology.

No Stockpiling in Wetlands or Buffers

No stockpiling of soils will occur in wetlands or buffers, other than the created wetlands during the construction of the mitigation area.

Construction Schedule

The mitigation project will begin upon receipt of permits and should be completed within one month.

Wetland Hydrology

The current wetland hydrology is supplied from local precipitation, groundwater, and surface water entering the site through three culverts. Two culverts under Odell Road drain to both Wetland A and Wetland B respectively. Another wetland drains ponded water to Wetland B from south of the Subject property. Wetland A hydrology is associated with an un-named drainage that extends through the wetland. A culvert under Odell Road conveys water from wetlands east of the subject property to Wetland A.

In order to retain and augment wetland hydrology, the created wetlands in Wetland A will be contiguous with the hydrological source of surface water in Wetland A, providing a hydrological connection with the unnamed stream. Presumed flooding of the stream during storm events would augment hydrology in the Wetland A created wetlands. This hydrological augmentation will ensure the longevity of the wetland.

The surface water input to Wetland B will not change. A flow control structure has been identified on Wetland B. Essentially, Wetland B is a bowl with two surface water inputs and a flow control structure functioning as an outlet. The creation wetland in Wetland B would retain the same hydrology. Created wetlands associated with Wetland B would be mosaic pattern wetlands of varying grades to save the maximum number of red alder and black cottonwood trees, which also thrive under wetland conditions.

The proposed enhancement and mitigation plan will greatly increase the habitat and hydrologic value of the larger more diverse Wetlands A & B. This mitigation plan compensates for wetland impacts by increasing the retention capacity and enhancing the habitat in wetlands and buffers.

It is recommend that wetland hydrology be augmented through the input of clean rooftop water to dispersion trenches located in the wetland buffer areas.

Improve Habitat Functions

This mitigation plan will provide a visual screen between the wetlands and proposed land use. Wetland functions are expected to improve with the installation of two (2) bird houses and two (2) bat boxes within the wetland and wetland buffer areas. Habitat diversity would be improved through the installation of habitat features in the wetland and the buffer that include placing a select number of downed logs over 12-inches in diameter on the forest floor, and/or by moving additional wood and downed woody debris into the created wetland and wetland buffer to improve wildlife habitat functions.

Soils in the wetland creation areas will be excavated to the elevation of the wetlands, thus providing hydrology for the new wetland areas. Wetland creation areas will be monitored for hydrology by installing groundwater monitoring wells in each created wetland. The mitigation wetland must meet the technical criteria for wetland hydrology, seasonal inundation, and/or saturation to the surface for a consecutive number of days greater than or equal to 12.5 percent of the growing season. Areas that are seasonally inundated and/or saturated to the surface for a consecutive number of days between 5 percent and 12.5 percent of the growing season may also be wetlands. Hydrology may be monitored through groundwater wells. If the wetland creation areas do not meet these conditions, additional excavation or the placing of a bentonite mat in some areas will occur to retain wetland hydrology.

8.2 Buffer Enhancement & Preservation

The preserved buffer areas will be enhanced totaling 158,217 sf and will include a planting strategy minimizing mortality and temporal loss and maximizing planting success (**Figure 6; Tables 3**). This strategy includes a planting plan to install a variety of hardy trees, shrubs and herbaceous plant species at a high density. Habitat features such as large woody debris and bird houses will be installed to jump start wildlife species diversity and to improve wildlife habitat. Buffer areas replaced through buffer averaging will also be enhanced using the same strategy. The total area of enhanced buffer replacement will total 26,334 sf.

Conifers will be planted in the preserved wetland buffer to provide a more structurally diverse habitat. The advantage of planting conifers, such as the western red cedar, is reflected in the quality of habitat that would best benefit the entire ecosystem. Conifers shade out invasive weeds and choke them out with acidic needles that discourage the germination and growth of non-native invasive weeds that would otherwise invade and dominate valuable riparian habitat. In addition, as the conifers mature, these large, long-lived trees produce large woody debris.

Channel morphology is strongly influenced by large woody debris (Keller and Swanson, 1979). Well-stocked riparian stands dominated by large conifers will provide adequate and sustainable supplies of large woody debris. Hardwood-dominated riparian stands are not capable of supplying sufficient long-term large woody debris inputs. Native shrub species also will be installed to help jump-start the process.

Table 3. Buffer Plan

Buffer Unit	Area	Comments
Enhanced Preservation Buffer	158,217 sf	Eliminate invasive weeds & plant native vegetation
Buffer Replacement	26,334 sf	Eliminate invasive weeds & plant native vegetation

Additional important considerations to achieve planting goals are invasive weed control, cost of plant stock, and the need to minimize maintenance by increasing plant survival. This can all be achieved through the planting of hardy, long-lived plant species, particularly conifers. Conifers would be installed to provide dense canopy cover, which would aid in shading-out sun-loving invasive weeds. The variety of shrubs and herbs would be planted to increase the native plant diversity within the mitigation areas, increase the functional value of the wetland buffers, and to provide a more structurally diverse wildlife habitat.

A portion of the conifer planting area will be within the riparian area. By planting long-lived and large-growing conifers in the riparian area, stream functions would improve over the existing weed-infested, ditch-like drainage. Conifers are expected to eventually form a closed canopy that would shade out invasive weeds. Acidic needles would carpet the forest floor discouraging the germination of invading aggressive, invasive weeds. Conifers would contribute to the recruitment of large woody debris, which in turn would enhance channel morphology in this ditch-like channel. Oregon ash and shrub species will also be installed to provide a more structurally diverse ecosystem and to enhance riparian functions of this small unnamed tributary drainage. A canopy of conifers helps to shade out invasive plant species. Soil acidity caused by a blanket of decomposing conifer needles inhibits the germination of invasive weed species.

8.3 Planting Plan

Planting Plan

The planting plan calls for installing native plant species to create additional vegetation classes (**Tables 4**). An upland forested class will be installed in the wetland buffer. This area will be re-vegetated from its existing invasive weed dominated condition to provide a higher quality buffer area.

Table 4. Planting Plan Area Calculations

Vegetation Class	Area		Estimated Costs
	SF	Acres	
Enhanced Preservation Buffer	158,217 sf	3.63	$26,587
Buffer Replacement	26,334 sf	0.60	$4,425.27
Wetland Planting (Creation Wetland)	237,069 sf	5.44	$39,838.04
Total	421,620	9.67	$70,850.31

Planting details are summarized in **Tables 5 through 7**. The total cost for plant stock covering the entire mitigation plan will cost an estimated $70,850.31. The plant species in the wetland will consist of native hydrophytic plant species. In contrast, the planting plan for the buffer area consists of planting upland conifers, shrubs, and herbs.

Fertilizer and Irrigation. A small amount of fertilizer will be added to the planting hole prior to installing the plant. An irrigation system will be installed in the mitigation buffer, as necessary, until the plants are established.

Table 5. Planting Plan: Enhanced Preservation Buffer

Klein Enhanced Preservation Buffer

	Area	Density	Plants
Trees	158,217	0.011478421	1816
Shrubs	158,217	0.028007346	4431
Herbs	158,217	0.061983471	9807
		Total # plants	16054

Trees

Plant species	Number	Container
Western Hemlock	605	bare root
Douglas fir	605	bare root
Western red cedar	605	bare root
Total	1816	

Shrubs

Plant species	Number	Container
Clustered rose	403	bare root
Red elderberry	403	bare root
Ocean Spray	403	bare root
Nootka Rose	403	bare root
Vine Maple	403	bare root
Red huckleberry	403	bare root
Hazelnut	403	bare root
Snowberry	403	bare root
Serviceberry	403	bare root
Evergreen huckleberry	403	bare root
Osoberry	403	bare root
Total	4431	

Herbs

Plant species	Number	Container
Trailing blackberry	1634	bare root
Cascade Oregon Grape	1634	bare root
Salal	1634	bare root
Deer Fern	1634	bare root
Sword Fern	1634	bare root
Spreading wood fern	1634	bare root
Total	9807	

Planting Density	#/Acre	#/sf
trees	500	0.011478421
Shrubs	1220	0.028007346
Herbs	2700	0.061983471

	Est. cost per plant	# Plants	Total Cost
Trees	$3.00	1816	$5,448.24
Shrubs	$3.00	4431	$13,293.71
Herbs	$0.80	9807	$7,845.47
		Total	$26,587.43

Total Cost of Plants	$26,587.43

Table 6. Planting Plan: Replacement Buffer

Klein Replacement Buffer

	Area	Density	Plants
Trees	26,334	0.011478421	302
Shrubs	26,334	0.028007346	738
Herbs	26,334	0.061983471	1632
		Total # plants	2672

Trees

Plant species	Number	Container
Western Hemlock	101	bare root
Douglas fir	101	bare root
Western red cedar	101	bare root
Total	302	

Shrubs

Plant species	Number	Container
Clustered rose	67	bare root
Red elderberry	67	bare root
Ocean Spray	67	bare root
Nootka Rose	67	bare root
Vine Maple	67	bare root
Red huckleberry	67	bare root
Hazelnut	67	bare root
Snowberry	67	bare root
Serviceberry	67	bare root
Evergreen huckleberry	67	bare root
Osoberry	67	bare root
Total	738	

Herbs

Plant species	Number	Container
Trailing blackberry	272	bare root
Cascade Oregon Grape	272	bare root
Salal	272	bare root
Deer Fern	272	bare root
Sword Fern	272	bare root
Spreading wood fern	272	bare root
Total	1632	

Planting Density	#/Acre	#/sf
trees	500	0.011478421
Shrubs	1220	0.028007346
Herbs	2700	0.061983471

	Est. cost per plant	# Plants	Total Cost
Trees	$3.00	302	$906.82
Shrubs	$3.00	738	$2,212.64
Herbs	$0.80	1632	$1,305.82
		Total	$4,425.27

Total Cost of Plants	$4,425.27

Table 7. Planting Plan: Wetland planting

Wetland Planting

	Area	Density	Plants
Trees	237,069	0.011478421	2721
Shrubs	237,069	0.028007346	6640
Herbs	237,069	0.061983471	14694
		Total # plants	24055

Trees

Plant species	Number	Container
Oregon Ash	907	bare root
Red Alder	907	bare root
Western red cedar	907	bare root
Total	2721	

Shrubs

Plant species	Number	Container
Clustered rose	604	bare root
Black twinberry	604	bare root
Pacific ninebark	604	bare root
Nootka Rose	604	bare root
Douglas spirea	604	bare root
Salmonberry	604	bare root
Hazelnut	604	bare root
Red-osier dogwood	604	bare root
Western crabapple	604	bare root
Bristly Gooseberry	604	bare root
Evergreen Huckleberry	604	bare root
Total	6,640	

Herbs

Plant species	Number	Container
Small-fruited bullrush	2449	bare root
soft rush	2449	bare root
Western buttercup	2449	bare root
Deer Fern	2449	bare root
Slough sedge	2449	bare root
Lady-fern	2449	bare root
Total	14,694	

Planting Density	#/Acre	#/sf
trees	500	0.011478421
Shrubs	1,220	0.028007346
Herbs	2,700	0.061983471

	Est. cost per plant	# Plants	Total Cost
Trees	$3.00	2,721	$8,163.53
Shrubs	$3.00	6,640	$19,919.02
Herbs	$0.80	14,694	$11,755.49
		Total	$39,838.04

Total Cost of Plants	$39,838.04

9.0 MONITORING PLAN

9.1 Monitoring Methodology

The monitoring program will be conducted for a period of three (3) years. A baseline analysis will be conducted at the end of the construction phase. This information will be used as a baseline to compare subsequent monitoring events. Field visits will be completed once per year for the first and second growing season and twice the third year there after to a total of three (3) years:

- At the time of construction completion.
- Early in the growing season of the first year after construction.
- Early in the growing season of the second year after construction.
- Beginning and end of the third growing season.

Monitoring will evaluate plant growth and establishment, condition of habitat quality, and wildlife usage in the enhancement area. If enhancement objectives are met at an earlier date, the applicant may request to end the monitoring phase earlier.

9.2 Vegetation

Permanent vegetation sampling points or transects will be established at the wetland enhancement site to incorporate the installed plants. The same monitoring point will be re-visited throughout the monitoring period. Vegetation will be recorded on the basis of relative percent cover. General plant health, percent survival, and plant species occurrence (including volunteer species) will also be recorded. Qualified personnel will conduct all monitoring.

Photo-points will be established from which photographs will be taken throughout the monitoring period. These photographs will document general appearance and progress in plant community establishment in the buffer enhancement area. Review of the photos over time will provide a semi-quantitative representation of success of the buffer enhancement plan.

Monitoring and photo-point locations will be recorded to keep a record of wetland enhancement success.

9.3 Wildlife

Birds, mammals, reptiles, amphibians, and invertebrates, which are readily observable (either by direct or indirect means), will be identified and recorded in the buffer enhancement area. Direct observations would include actual sightings, while indirect observations include tracks, scat, nests, song, or other indicative signs.

9.4 Success Criteria

Success of plant establishment within the wetland will be evaluated on the basis of both percent survival and percent cover of installed species. Planting success will be based on at least an 80% survival rate following each monitoring event. Successful plant establishment will also be met if there is at least a 60% areal cover of a combination of planted species and equivalent recruitment of native woody species by the end of the third-year monitoring period. Its success would be established based on subjective criteria, such as longevity in the system, value to fish habitat, and the incorporation of complexity in this human altered waterway.

9.5 Performance Standards

Hydrology

- The mitigation wetland must meet the technical criteria for wetland hydrology, seasonal inundation, and/or saturation to the surface for a consecutive number of days greater than or equal to 12.5 percent of the growing season. Areas that are seasonally inundated and/or saturated to the surface for a consecutive number of days between 5 percent and 12.5 percent of the growing season may also be wetlands. Hydrology may be monitored through the use of one or a combination of the following: groundwater wells, piezometers, crest gauges, hand-dug soil pits, staff gauges, and continuous recording flow meters.

Vegetation

- 80% survival rate following each monitoring event.
- 60% areal cover of a combination of planted species and equivalent recruitment of native woody species by the end of the third-year monitoring period.

Soils

- Hydric soils must cover 80% of created wetland area within 5 years.
- Hydric soil characteristics shall be monitored through the use of one or a combination of the following: Munsell soil color, pH, particle size, redox potential, organic content, microbial activity, time and duration of saturation or ponding, and alkalinity. (M)

Habitat & Wildlife

- Nesting by one bird species will be documented by providing a photographic record of a successful brood, or nest with eggs.
- No establishment of bull frogs or their tadpoles.
- There will be a vegetated upland buffer between the wetland and the proposed development consisting of shrubs and trees with an average height of ten (10) feet within three (3) years.

9.6 Maintenance (M) and Contingency (C)

Established performance standards for the project will be compared to the monitoring results in order to judge the success of the buffer enhancement plan. Contingency measures will include the items listed below and will be implemented if these performance standards are not met. Maintenance and remedial action on the site will be implemented immediately upon completion of the monitoring event (unless otherwise specifically indicated below).

Planting Plan

- Replace dead plants with the same species or a substitute species that meets the goals and objectives of the plan. (M & C)
- If the performance standard for vegetation is not satisfied following each monitoring period, re-plant areas after reason for failure has been identified and resolved (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.). (M & C)
- If the areal cover of reed canarygrass exceeds 20% of the wetland area, measures will be taken to reduce areal cover below 20% through: 1) adjusting water levels in the wetland to flood or dry out the reed canarygrass, 2) use City of Blaine approved herbicides, or 3) mechanical means to physically remove the reed-canarygrass from the wetland and re-plant the area with native plant species. (M & C)
- Remove/control weedy or exotic invasive plants (e.g., Scot's broom, reed canarygrass, Himalayan blackberry, purple loosestrife, etc.) by manual or chemical means approved by City of Blaine, if not meeting performance standard following each monitoring event. Use of herbicides or pesticides within the buffer enhancement area would only be implemented if other measures failed or were considered unlikely to be successful. (C & M)
- Re-plant areas after reason for failure has been identified (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.). (C)

Hydrology

Performance standards pertaining to water regime are to be established, as defined below:

- If the wetland creation areas do not maintain wetland hydrology, additional excavation or the placing of a bentonite mat will occur to retain wetland hydrology. (C)

Soils

- If soils do not meet performance standards, reason for failure will be determined and corrective measures will be taken that may include excavation or grading to attained preferred water regime, raise water level by creating log jam structure or similar in drainage to back up water, or by some other means.

Wildlife & Habitat

- If no bird or bat nesting occurs after the second season, contact the Washington Department of Fish and Wildlife for corrective measures.
- If bullfrogs or their tadpoles are identified during the monitoring periods, eliminate bullfrog establishment through planting more trees at the edge of the water to shade out this sun-dependent species.
- If a vegetated upland buffer between the wetland and the proposed development does not consist of shrubs and trees with an average height of 10 feet within 3 years, the reason will be determined and corrective measures will be taken that may include, planting larger tree stock, irrigate, or fertilize.

10.0 COST ESTIMATE

Item	Estimate cost
Plants	$70,850
Grading	$1,500
Construction crew	$3,500
Monitoring	$5,900
Contingency	$3,000
Total	$84,750

Under City of Blaine Code Chapter 17.83.100(A), "the director may require a bond in an amount and with surety and conditions sufficient to secure compliance with the intent of this chapter. In the event of a breach of any condition of any such bond, the city may initiate an action in a court of competent jurisdiction upon such bond."

11.0 SUMMARY AND CONCLUSION

The proposed development project consists of commercial development with associated roads and parking. Unavoidable wetland fill will occur to comply with County zoning requirements and to achieve economic viability of the land use project. Impacts to higher quality wetlands will be avoided. Unavoidable impacts will occur on lower quality wetlands. Lower quality wetlands will be replaced at a 1.63:1 ratio with a larger higher quality wetland system. Wetland buffers will be averaged and enhanced to provide greater functional value to the wetlands. Wetland functions will improve with the enhanced buffer area. Overall, the project will fill low quality wetlands with larger high quality wetland complexes, increasing wetland functions.

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Figures

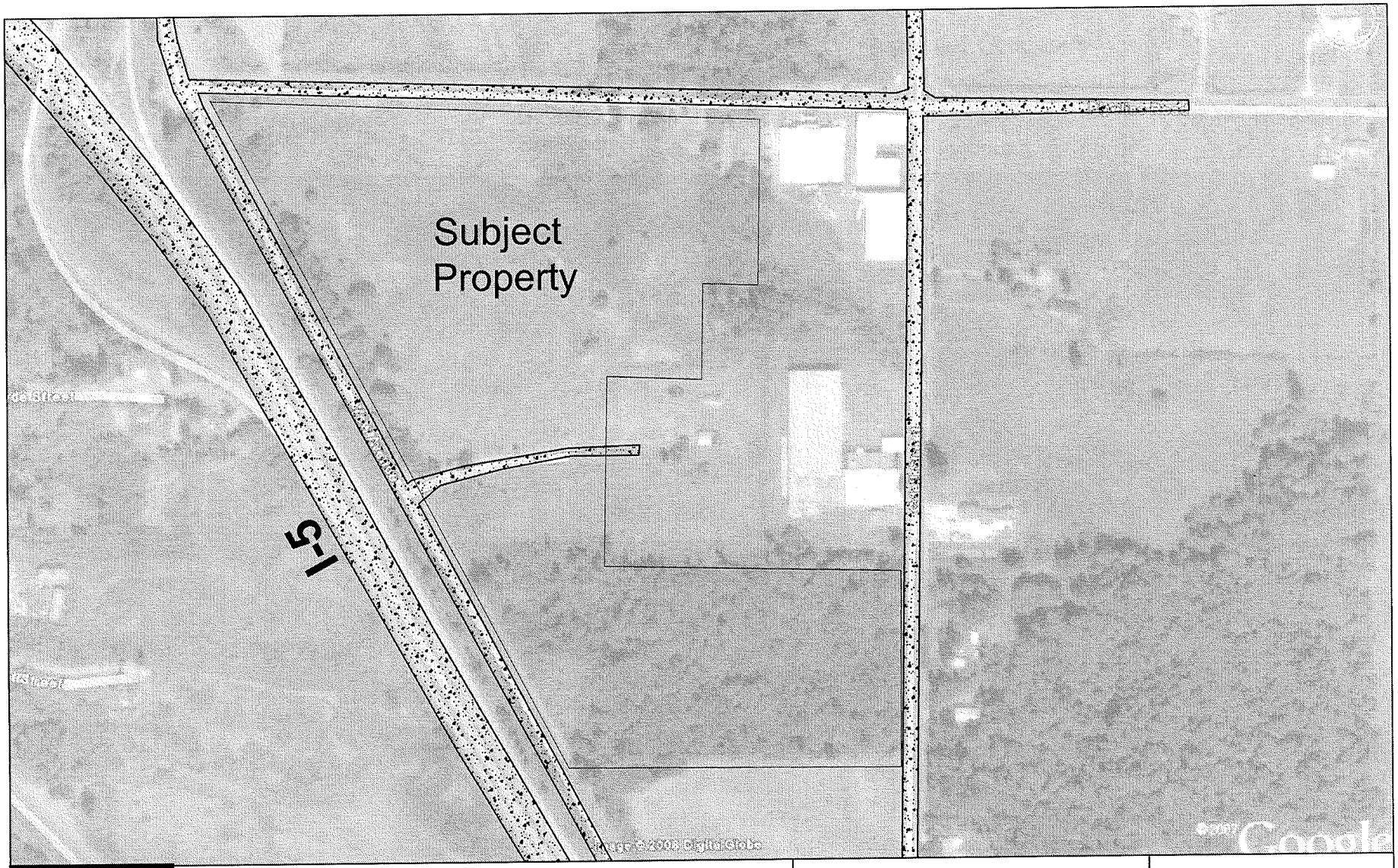

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Figure 1

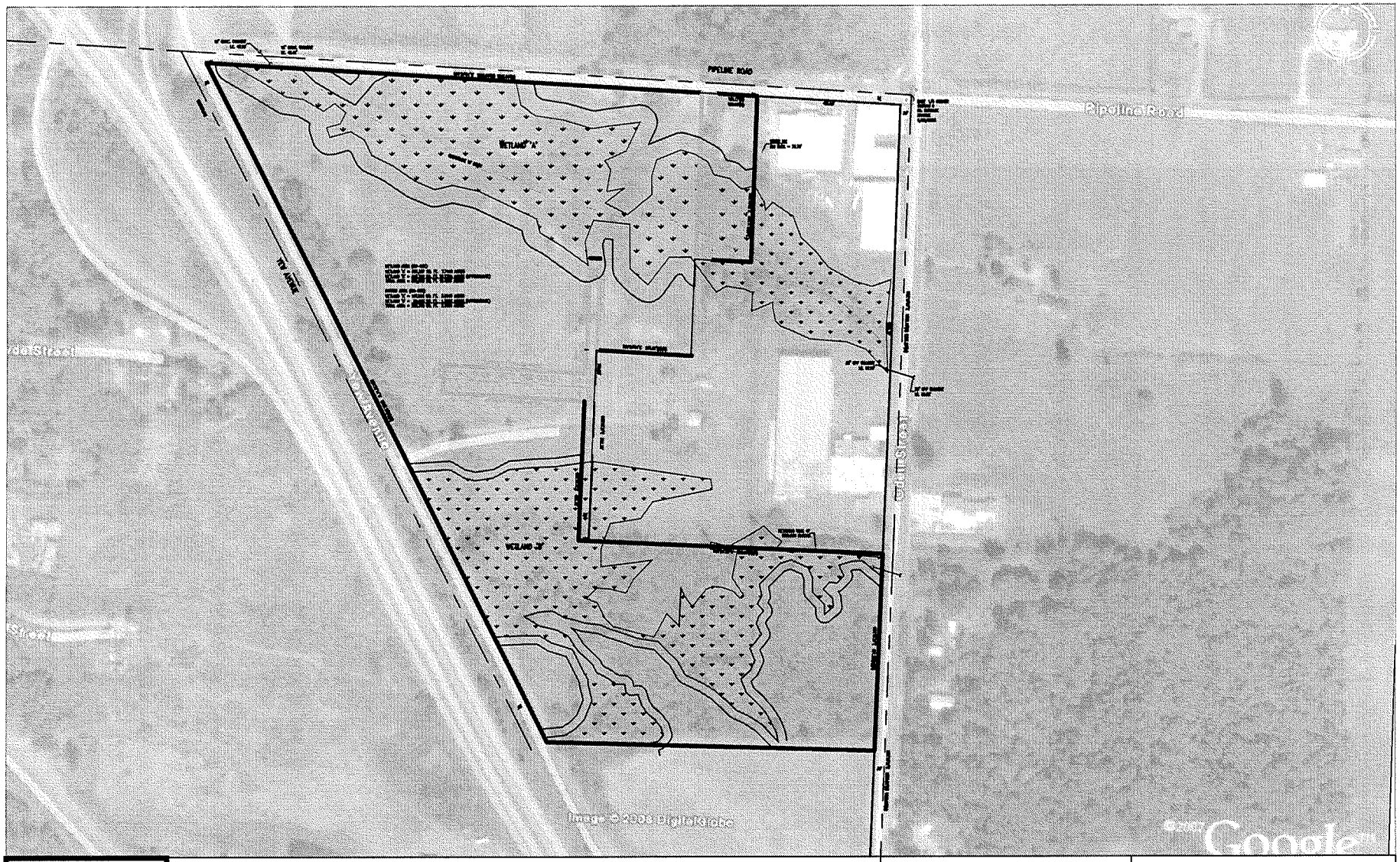
Klein Property

Vicinity Map

Scale: 1" = 400'

0 400'

6 September 2010



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Wetlands

Drainage

Survey by
Riipenin Surveying

Figure 2

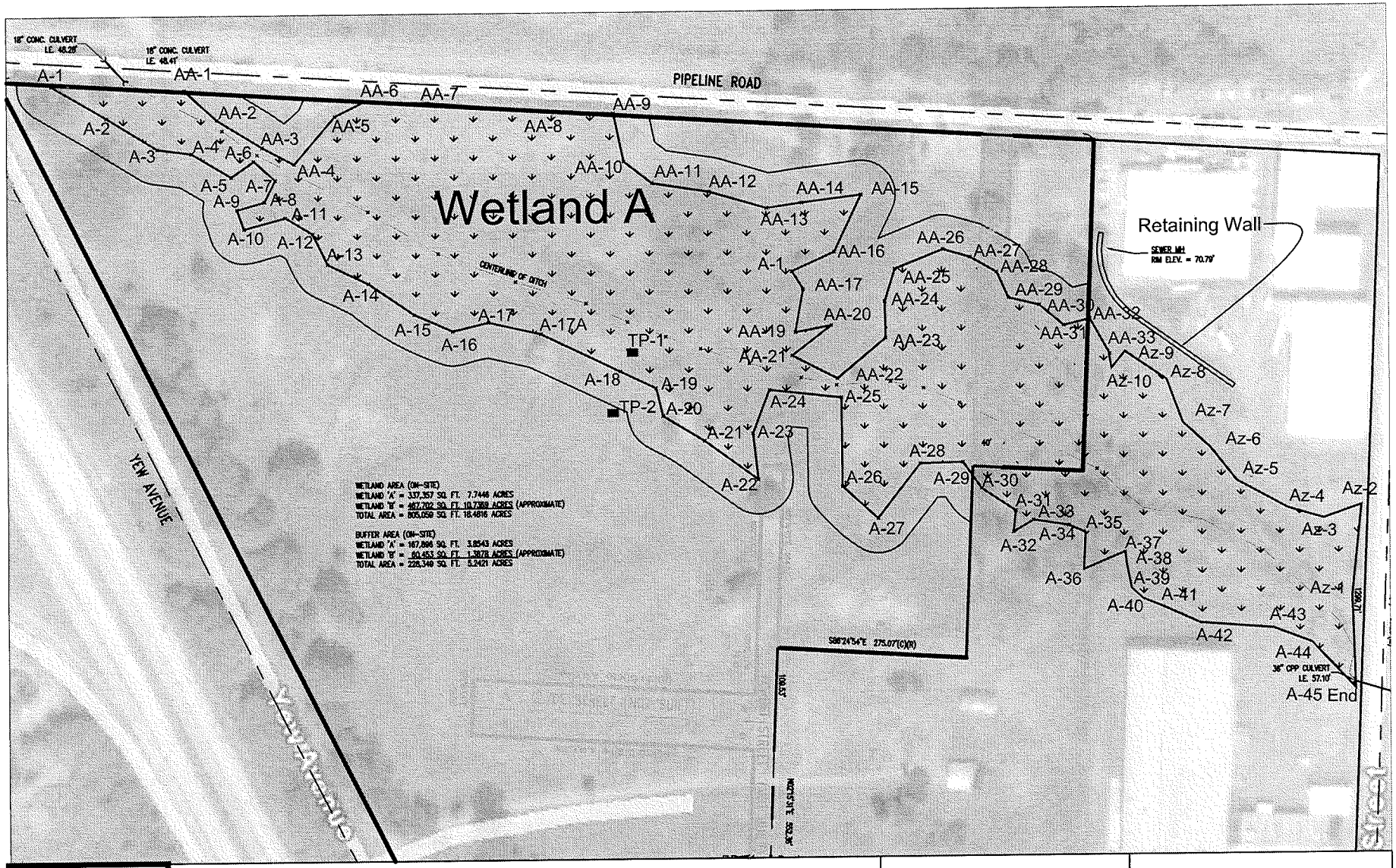
Klein Property

Existing Conditions

Scale: 1" = 400'

0 400'

13 May 2010



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Wetlands

Drainage

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Figure 3

Klein Property

Existing Conditions
(Wetland A)

Scale: 1" = 200'

0 200'

6 September 2010

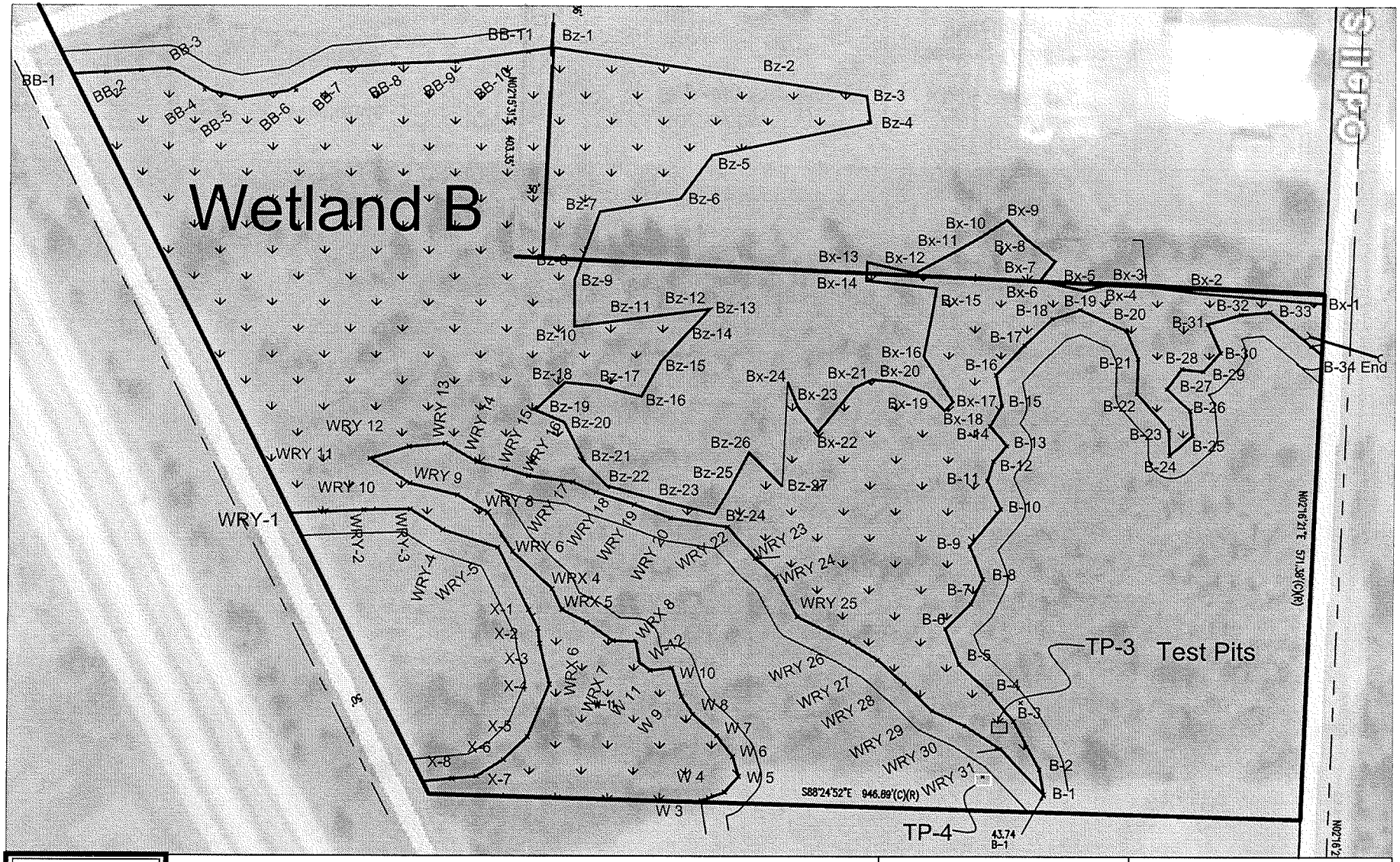

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Figure 4

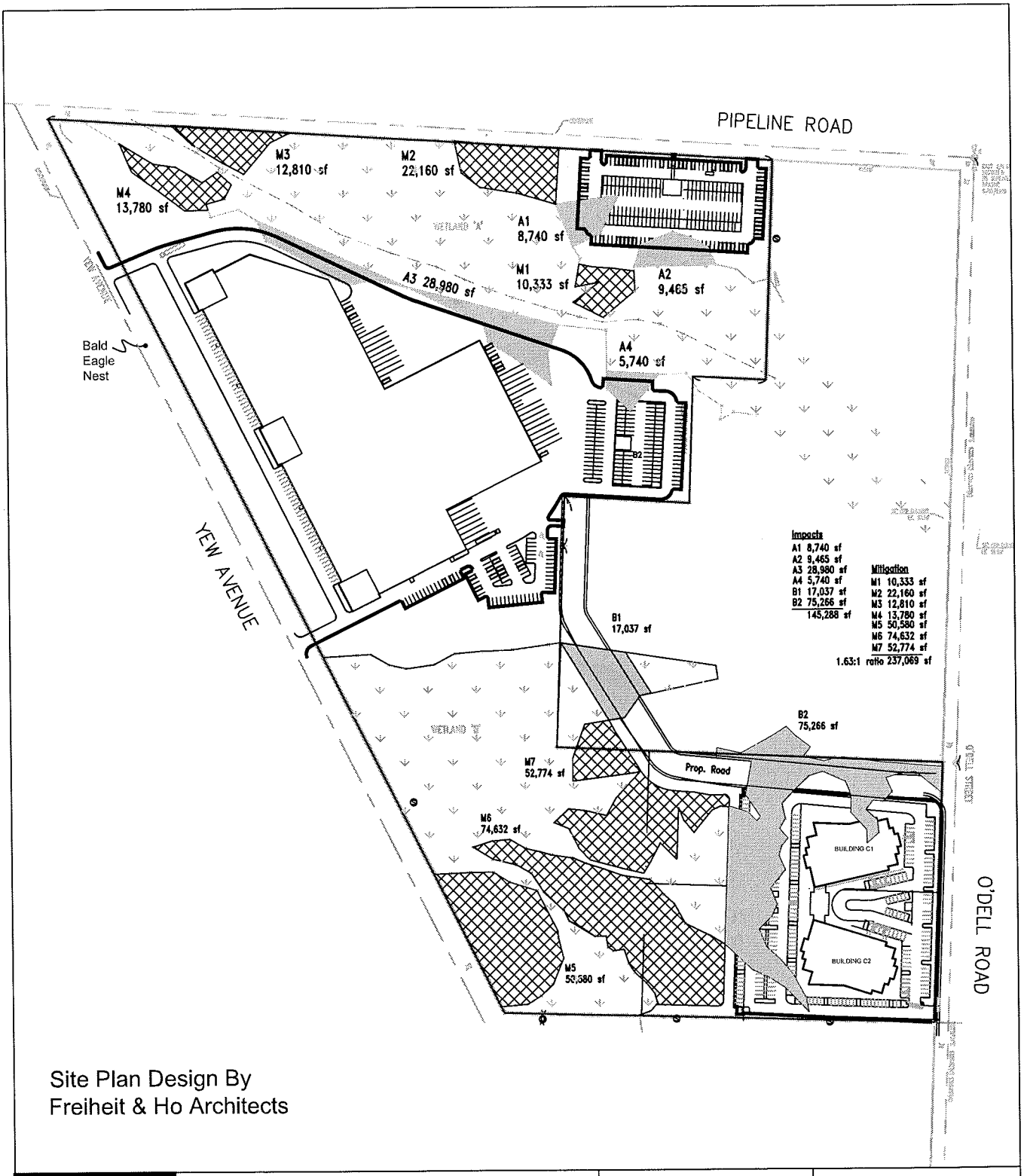
Klein Property

Existing Conditions
(Wetland B)

Scale: 1" = 150'

0 150'

6 September 2010



Site Plan Design By
Freiheit & Ho Architects

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Wetlands

Wetland Impacts (145,288 sf)

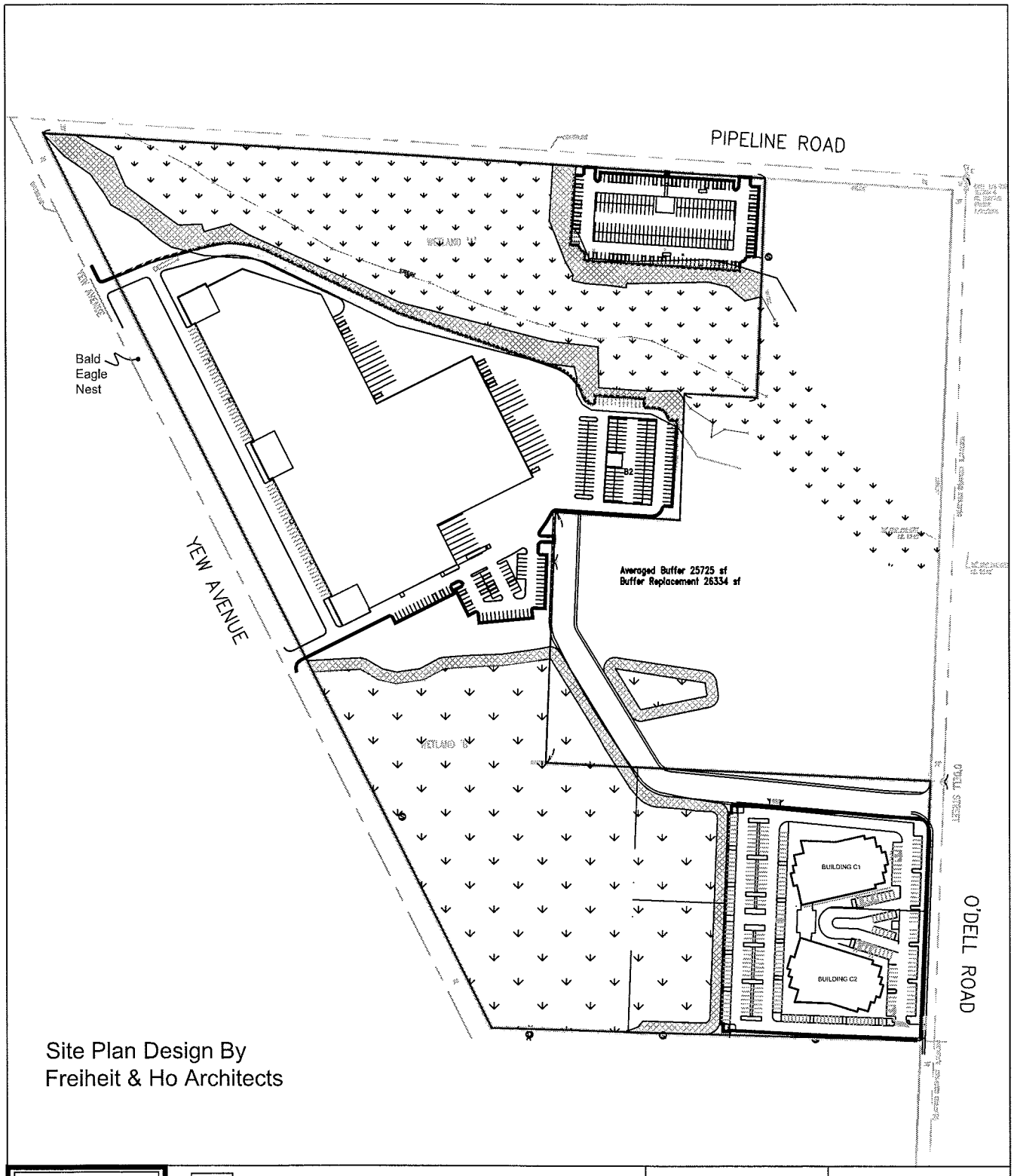
Wetland Creation (237,069 sf)

Drainage

Figure 5
Klein Property
Option A
Site Plan &
Mitigation Plan

Scale: 1" = 300'
0 300'

6 September 2010



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Wetlands
Preserved & Enhanced Buffer (158,217 sf)
Averaged Buffer 25,725 sf
Buffer Replacement 26, 334 sf

Figure 6
Klein Property
Option A
Buffer Averaging Plan

Scale: 1" = 300'
0 300'
28 October 2008