LACAMAS SHORES

PERMIT REVISION

June 23, 1993

To: Shoreline Committee Members

From: D. Quinn

Re: Lacamas Shores Shoreline Permit

Date: June 22, 1993

The City has received an application to revise the Shoreline Permit issued to Vanport Manufacturing for development of Lacamas Shores residential subdivision. Briefly, the history of the permit issuance is: 1) a permit was issued by the City of Camas (June, 1988); 2) the permit was forwarded to Washington State Department of Ecology (DOE) for review; and 3) the permit was appealed by Citizens to Save Lacamas Lake [aka: Clark County Citizens in Action (CCCIA)], to the State Shorelines Hearing Board where an Order of Remand was issued with conditions (Sept. 1988).

The following facts, findings and recommendations are segregated into three distinct but related categories: 1) Conservancy Zone dimension issue: 2) View Easement request; and 3) Storm water piping relocation. This separation is for ease of reading only. The proposed revision should be considered as a whole when weighing impacts and proposed mitigation.

To assist you in understanding these complex issues a chronological list of correspondence accompanies this staff report. The report is organized in the following manner:

I FACTS:

1) The dedication of the Conservancy Zone (CZ), which was represented as 100 feet wide, is less than was approved.

Historical:

Due to erroneous interpretation of the aerial photograph used by MacKay and Sposito Engr., the shoreline was misplotted. Refer to **Exhibit "A"** for a map showing the 100 foot CZ in relationship to the property lines and the top of bank. The legal description prepared by MacKay and Sposito Engr. was dimensioned off of the mapped shoreline. The dedication of the CZ to the City has taken place. As a result of the error, an overlap exists between the CZ and private property.

The City's ownership, as shown on the enclosed map, **Exhibit "B"**, extends from the shore to the back lot lines of the properties. The average dimension calculates out to 90 feet. Actual dimensions vary between 75 and 110 feet. Developed properties have typically been cleared and landscaped including the overlapped CZ area.

A letter dated March 20, 1993 from DOE states, "removal of vegetation within the 100 foot zone was not specifically allowed by the permit and as such vegetation removal on private property within 100 feet of the shore is prohibited". A copy of this letter was mailed to all property owners affected by the overlap, as well as Vanport Manufacturing and the Lacamas Shores Homeowner's Association. Subsequent interpretation by DOE allows vegetation to be planted, by hand, within the CZ.

Twenty-six (26) lots within Lacamas Shores Phases 3, 4, and 5 are affected by the CZ overlap. The overlap affects all but one lot located along the shoreline. The affected properties include Lots 1 through 14 of Phase 4; lots 1 thru 4 and 6 thru 12 of Phase 5; and lot 3 of Phase 3.

The Lacamas Shores Homeowner's Association has submitted a proposal

to resolve the shortage by dedication of approximately 1 acre of land located adjacent to the canoe launch and between the lake and the trail. Refer to **Exhibit "C"**, aerial map. The dedication would be substituted for the .6 acre of private property overlapped by the CZ. A survey conducted by the JD White Co. estimates the uplands area is approximately fifty feet in width (1/2 acre). Refer to **Exhibit "D"**, the July 15, 1992 survey letter.

The CZ associated with Phases 4 & 5 of Lacamas Shores development is typically a 50% slope. The CZ area has a long history of instability evidenced by curved tree trunks, dislodged boulders, exposed and weathered sand stone and soil sluffing. A number of seeps flow across the area. The zone is typically wooded and includes ash, alder, big leaf maple, vine maple and evergreens. Ground cover includes snowberry, blackberry, ivy and various species of ferns.

On April 27, 1993 Vanport Manufacturing sponsored a presentation by Bob Adams, J.D. Walsh & Associates, Inc. Approximately 20 residents attended the meeting. The focus of the meeting was to educate residents of Lacamas Shores in the following areas:

* Functions of the Conservancy environment
* Major influences to CZ
* Contamination sources
* Consequences of inappropriate use
* Alternatives to herbicide, pesticide and fertilizer use
* Environmentally conscientious life styles & product information
* History of lake clean up efforts

The information presented at the meeting will be incorporated into a packet and will be available to all residents within the development.

Residents whose properties abut the CZ were questioned whether they would allow the revegetation of their property by Vanport Mfg., or do it themselves, in that area overlapped by the CZ. 18 of the 26 property owners responded in favor of allowing the revegetation on their property. Refer to **Exhibit "E"**.

Regulatory:

The 1990 Shoreline Management Guidebook states... "The intent of the CZ is to protect, conserve and manage existing natural resources.... to achieve sustained resource utilization and provide recreational opportunities". The CZ environment does not preclude private ownership, but does place certain limitations on the degree of disturbance that may take place. Development activities within the CZ which are regulated should be clearly

addressed within the shoreline permit. The 1988 permit issued for Lacamas Shores is silent as to restrictions or provisions of vegetation removal.

Chapter 18.64.120 - Camas Municipal Code limits accessory structures in rear yards to a maximum of 30% coverage and precludes said structures within 5 feet of side and rear lot lines.

No dwellings be within the 100 foot CZ. Rear yard set back in the Lacamas Shores development is 25 feet. The overlap does not exceed the 25 foot rear yard set back on any of the undeveloped lots in question. No dwelling structures on the developed lots encroach into the 100 foot CZ.

Current practice by the City requires a site specific survey which locates the CZ line on property for which the owner requests a building permit. Permits are subsequently issued contingent upon no work occurring within the overlap area.

2) The Conservancy Zone dedication, from Vanport Inc., to the City, reserved the right ..."for the free and uninterrupted access and enjoyment of light and view over and across the conservancy zone for the windows and roofs of the improvements to be constructed...".

Historical:

The CCCIA contends that the view easement was not considered in the original permit and is therefore illegal. They further contend that the dedication condition was inappropriately accepted by the City.

DOE staff member Nora Jewitt stated in correspondence dated February 4, 1992, item 1...."In addition the deed to the City retains to the land owners the right to remove vegetation to preserve views. This was not set forth in the Remand and can lead to widely divergent opinions as to what vegetation or trees enhance or detract from the views.... We feel this restriction in the deed to the City violates the intent of the Zone....In keeping with the Conservancy environment policy to maintain the general character of the area, the 100 foot zone is crucial in protecting the slope integrity and vegetative cover that promotes stable slopes and adds to the aesthetics of the site - both from the land and water side. Any plan to correct the lot lines or compensate for them must support the aesthetics and character of the shore area".

The City Attorney interprets the easement as reserving rights for removal of vegetation. These rights are normally specified or set forth within the shoreline permit.

Vegetation removal and management practices have been exercised

within the Lacamas Shores development in the past. Such practices have been cooperative efforts by the City, DOE, Vanport and CCCIA and have taken the form of trail construction, gazebo construction, parking lot construction, select harvesting for disease control and removal of hazardous trees and limbs. In the immediate vicinity of Lacamas and Round lakes the shoreline vegetation has been managed/altered in a number of instances including: Leadbetter Road, SR-500 bridge, Round Lake dam, Moose Lodge with launch and docks, Round Lake Park improvements, Lacamas Heights developed area, Frank's Moorage, Wildlife League boat launch, Camp Currie and the church camp on Goodwin Road.

The 1988 Order of Remand is silent as to the provision of or exclusion of the right to manage vegetation for views. Refer to **Exhibit "F"** for a copy of the Order of Remand.

Regulatory:

City of Camas Shoreline Management Master Program, 1977 - Conservancy Environment Objectives states...

1. To protect, conserve and manage existing natural resources....
2. To insure a continuous flow of public recreational opportunities.
3. To achieve sustained resource utilization.
4. To maintain the existing character of the environment.

It further states..."preferred uses within the Conservancy environment, among others, are agricultural practices, Single family dwellings and public recreation".

State of Washington Shoreline Management Policy Handbook identifies Conservancy Zone management policies as...

a) Preferred uses within the conservancy environment are those which are non-consumptive of the physical and biological resources of the area and activities of a non-permanent nature which do not substantially degrade or alter the existing character of the areas. Non-consumptive uses are those uses which utilize resources on a sustained yield basis while minimally reducing opportunities for other existing and future uses of the resources of the area. Refer to the attached **Exhibit "G"** titled Conservancy Environment for complete information on the purpose, designation and management criteria for the area.

3) Relocation of the storm water disposal system, located along the rear lot lines of phases 4 and 5 and one lot of phase 3.

Historical:

The storm water disposal system serving Lacamas Shores consists of a bio-filter system and bubbler system. The two systems are similar in basic design, that is both collect storm water in screened, oil separating catch basins which flow into screened chambers. Solids and sediment are removed in both the catch basin and screening chamber. Storm water then flows into a perforated pipe located about 3 feet below grade and percolates upward to the surface in a laminar flow (smooth flow) condition.

The difference between the two systems occurs at the point of discharge. The bio-filter system discharges water into a wetlands area. The bubbler system discharges water to the brow of the bank overlooking the lake. In both systems the storm water is further treated as it flows across the wetlands and CZ. The bubbler system locations at the top of the lake bluff are aggravating erosion and may be contributing to the instability of the bank. Relocation of the bubblers away from the bluff will eliminate the aforementioned issues.

The bio-filter has been monitored for the last four years by Scientific Resources, Inc. The cover letter for the most recent study year states...

> "The wetlands appear to be removing nutrients and pollutants from the storm water that is being applied, and there is presently no evidence that there is any adverse impact on the wetlands. In cases where the inflowing concentrations of the monitored water quality parameters are greater than the established site specific levels, there is always a decrease in these parameters after passing over the wetlands. Soluble and total phosphorus entering the lake from the wetlands are at concentrations at or below the compliance levels established by the previous two years monitoring. Nitrate levels were exceeded in the winter time at two dates (possibly due to lawn fertilization), but returned to below compliance levels for the remaining of the monitoring year...."

Copies of the full report are available in the Public Works Department for your review.

As part of the proposed revision, Vanport Mfg. has submitted a design which relocates the bubbler discharges located at the brow of the bank to the field adjacent to the canoe club launch. The City commissioned an evaluation of the design proposed by Vanport Manufacturing and MacKay & Sposito Engineering. The evaluation was conducted by Beak Consultants, Inc. in September of 1992. The study considered soil type, proximity to bedrock, sediment input, phosphorus removal capability, nitrogen removal capability, general design considerations and plant materials. The

study concluded: 1) The proposed design follows suggested criteria contained within the Stormwater Management Manual for the Puget Sound Basin - 1992; and 2) The bubbler/biofilter/settling pond system provides several redundant features that will ensure the water quality of Lacamas Lake. Beak further states, "It is an excellent system for remedying stormwater runoff from Lacamas development". Refer to **Exhibit "H"** for a copy of the report.

February 8, 1992 correspondence from Nora Jewitt, DOE, states..." At this point, the proposal to route storm water down to the reserve area looks like the best alternative".

Regulatory:

The area that would be disturbed by the proposed storm system reconstruction would be less than the 5 acre threshold, beyond which a National Pollutant Elimination Discharge Permit (NPDES) would be required.

An "Encroachment Permit" is required for any work done in City right-of-way. The permit identifies the nature of work as well as the schedule of activities.

4) After reviewing the issues, staff recommends an "Addendum" to the E.I.S. and a "Revision" to the Shoreline Permit. Both processes provide for public input and review.

5) The Parties of Record include:

- Vanport Manufacturing Co.
- Citizens to Save Lacamas Lake; (current name Clark County Citizens in Action)
- City of Camas
- Washington State Department of Ecology

6) The City of Camas conducted a series of three meetings between the affected parties. The meetings were held on February 22, March 3 and March 22, of this year in the Camas Community Center. During the 10 hours of meeting the various problems and solutions were discussed. The purpose was to reach resolution on the three identified problems. The following section titled "Findings" benefits from the discussions of these meetings.

II FINDINGS:

1) Conservancy Zone Shortage and Property Overlap.

a. The primary functions of the CZ specific to the Lacamas Shores Development are identified as follows:

a. Slope Stability

ordered & info remand recorded –

b. Wildlife Habitat/Natural Area
c. Water Quality
d. Lake Access
e. Aesthetics

b. Conservancy Zone slope stability will be enhanced by removing the existing bubbler systems located at the brow of the bank. Relocation should be to a lower area proximate to the lake.

c. Wildlife Habitat and the natural aesthetics of the CZ should not sustain activities that degrade these elements on a permanent basis. Vegetation within the CZ encourages wildlife and preserves the natural feeling of the area. The revegetation of the CZ would enhance it's function in these areas.

d. Water quality is improved by directing runoff flows through vegetated areas. Vegetation further minimizes the potential for erosion and takes up nutrients prior to flows entering receiving waters. Vegetation on steep banks is generally more apt to minimize the potential for erosion as opposed to vegetation on flatter areas. Therefore, revegetation efforts should be targeted to steep slopes disturbed by residential use.

e. Lake access remains unaffected with regard to the pending proposal.

f. The functions of the CZ can be preserved within the reduced area with enhancement of the zone. Enhancement should take the form of revegetation of exposed and disturbed or steep areas, as well as removal of the storm water disposal system located at the top of the lake bank.

g. Education of the property owners within Lacamas Shores is important to heighten awareness of the CZ and identify steps to preserve and enhance its functions.

h. Riparian environments, similar in function to the CZ and proximate to the lake should be preserved. Dedication to the City of a parcel similar in area to the overlapped area which provides an environment similar to the CZ would adequately satisfy the original intent of the dedication.

i. Parcels still under the ownership of the developer should be reconfigured out of the CZ to eliminate additional conversion of those areas into residential uses (lot #11 - Phase 4 & lot 11 - Phase 5).

j. To minimize future intrusions into the CZ, it should be clearly marked in a permanent manner.

k. Correspondence dated February 4, 1992, from Nora Jewitt, DOE,

reiterates the importance of the CZ but clearly states.."Any plan to correct the lot lines **or compensate for them** must support the aesthetics and character of the shore area". The proposal submitted by Vanport Mfg. compensates by dedication of land, enhancement through stormwater modifications and revegetation. Later correspondence (refer to August 18, 1992 letter from office of Attorney General of Washington) states that "Ecology is willing to agree to the following, which amplifies upon the proposals set out in your letter". The proposal which Ecology refers to is founded on the concept of exchanging land and revegetation to resolve the CZ survey error.

1. It is likely that property owners will allow Vanport, or take it upon themselves, to revegetate the CZ area on their property. This is based upon 18 of the 26 owners responding favorably to a request to do so. All affected property owners were not available for comment, therefore, the actual participation may be even higher.

2) View Easement and vegetation management. plant stability

a. Trimming/thinning of trees and vegetation within the CZ is permissible within the guidelines of the State and local shorelines management policies. This is based upon guideline statements allowing activities which..."utilize resources on a sustained yield basis", "non-permanent activities", and "those which do not substantially degrade or permanently deplete...resources".

It is also clearly the intent of the management policies that activities be managed in a manner that does not permanently degrade the CZ. Vegetation removal has occurred throughout the Lacamas Lake area. A management plan, as is being proposed herein, is not inconsistent with historical practices in the basin and the region.

b. Tree and vegetation removal proximate to the lake would have a greater impact to the aesthetics of the CZ, while providing only minimal view enhancement.

c. With proper management, views over the CZ can be preserved without compromising the function of the zone. Proper management must consider the more vulnerable areas such as steep, unstable or exposed soil, water - shoreline interface and water courses.

d. To ensure a healthy CZ, a management plan must be prepared by a qualified professional. Key elements of a plan for Lacamas Shores development are: 1) prohibit actions that would have detrimental impacts to the function and stability of the CZ; 2) provide clear and specific management practices; and 3) trimming and thinning activities should be offset by plantings in accordance with an approved species list.

All requests by Sept 1

1 primary & 1 secondary

infiltration -

3) Storm water relocation and treatment archeological study

a. The storm water treatment concept used at Lacamas Shores is adequate to properly treat storm water runoff. This is substantiated by the annual monitoring report prepared by Scientific Resources Inc. Bio-filtration is an acceptable means of treatment throughout the State and County. Nutrient removal is enhanced when bio-swales are used in conjunction with an open water system as is the case with this proposal. An added treatment element occurs as runoff flows through a marshy area prior to reaching open water.

b. Relocation of the bubbler systems to a level area will reduce the potential for sediment transport and soil sluffing. Access to the bubblers is also improved. The revision proposes a site with full perimeter access, unobstructed by buildings.

c. Due to the sensitive nature of Lacamas Lake,the design should meet the standards for discharge and quality established by the DOE as set forth in the Stormwater Management Manual for the Puget Sound Basin. Clark County has proposed an ordinance which identifies the Lacamas Basin as one requiring advanced control for nutrients. The proposed system meets the water quality standards identified by DOE and the County for advanced nutrient control.

d. To ensure proper treatment of runoff, a monitoring program should be implemented.

III CONDITIONS OF APPROVAL:

Staff recommends approval with the following conditions:

1) Conservancy Zone Shortage and Property Overlap.

a. The Conservancy Zone shall be marked using iron rods with aluminum caps stamped "Cons. Zone". Rods shall be located along lot sidelines and set flush with the ground.

b. Vanport shall resurvey Lot 11 of Phase 4 and Lot 11 of Phase 5, Lacamas Shores, establishing the northerly property line 100 feet from the waters edge. The survey shall be recorded with the County.

c. There shall be a 100 foot setback from the ordinary water mark to dwelling structures. Prior to issuance of a building permit, the owner must supply information verifying that no portion of the dwelling structure encroaches into the setback area. Uses normally associated with a residential unit, consistent with the codes of the City, are permissible within the limits of the private property. In accordance with City codes, no accessory structures are allowed within five feet of the side or rear property lines.

Accessory uses are those except fences, landscaping, or soil not supported by a retaining structure.

d. Vanport shall deed to the City of Camas, within 90 days of approval, that parcel of land identified in **Exhibit "B"**. Said parcel shall contain a minimum of 0.6 acres.

e. Vanport agrees to plant trees, shrubs and plants in the Conservancy Zone between the trail and the development. Revegetation shall be in accordance with the following schedule:

Approved Species List

Botanical Name/ Common Name	Size	Quantity
1) Acer circinatum Vine Maple	5'-6'	18
2) Acer macrophylium Big Leaf Maple	8'-10'	2
3) Alnus rubra Red Alder	8'-10'	1
4) Arbutus menziesil Pacific Madrone	5'	2
5) Corylus sp. Wild Filbert	5'-6'	8
6) Crataegus douglasil Douglas Hawthorne	5'-6'	4
7) Fraxinus latifolia Oregon Ash	8'-10'	1
8) Prunus sp. Wild Cherry	5'-6'	1
9) Pseudotsuga menziesii Douglas Fir	4'-5'	1
10) Salix sp. Willow	3'-4'	4
11) Taxus brevifolia Pacific Yew	3'-4'	8
12) Thuja plicata Western Red Cedar	4'-5'	1
13) Tsuga heterophylia	4'-5'	1

	Hemlock		
14)	Gaultheria shallon Salal	1 Gal.	94
15)	Mahonia aquifolium Oregon Grape	1 Gal.	94
16)	Physocarpus capitatus Ninebark	18"-24"	36
17)	Polystichum munitum Sword Fern	1 Gal.	94
18)	Rubus spectabilis Salmonberry	12"-15"	46
19)	Sambucus sp. Elderberry	2'-3'	34
20)	Symphoricarpos sp. Snowberry	1 Gal.	61

Plantings shall be done consistent with guidelines established by a qualified professional and shall be installed by a licensed landscape contractor. Revegetation shall be prioritized as follows: 1) Unstable or exposed areas
2) Steep areas
3) Proximate to the rear line of lots abutting the Conservancy Zone
4) Adjacent to the trail in areas that would screen the development from the trail

Stakes indicating the location and species to be planted shall be set out within the Conservancy Zone. The proposed locations are subject to adjustment by the City.

f. With the permission of the respective owners, revegetate the portion of private properties located within the Conservancy Zone. Revegetation shall be with native species in accordance with the aforementioned list. Where possible, plantings should be targeted for steep and exposed areas.

g. A training and information seminar shall be provided to all residents within Lacamas Shores. The class shall provide information regarding the following: Functions of the Conservancy environment, Major influences, Contamination sources, Consequences of inappropriate use, Alternatives to herbicide, pesticide and fertilizer use, Environmentally conscientious life styles & product information, and History of lake clean up efforts.

2) View Easement and vegetation management.

The proposed revision requests language which would guide the management of trees and vegetation for preservation of views. Staff recommends approval with the following conditions:

a. A fundamental policy guiding all management practices within the Conservancy Zone is that no activity is allowed which adversely affects slope stability within the Conservancy Zone.

b. Each parcel may maintain one primary and two secondary views. Primary view is intended to provide an unobstructed view. Secondary views may be partially obscured, up to one third, by trees.

c. All vegetation removal and replacement will be in accordance with the "View Shed Management Plan for Lacamas Shores". Refer to **Exhibit "I"**, for a copy of the plan.

d. Prior written authorization is required for removal of trees or limbs over 6" in diameter. Trees over 12" in diameter at breast height shall not be removed for purposes of view.

e. Violation of the Camas Shoreline Management Master Program or State regulations are subject to penalties identified in Chapter 173-17 of the Washington Administrative Code. Enforcement actions include but are not limited to issuance of a cease and desist order, corrective action and civil penalty. Currently, a civil penalty shall not exceed $1000.00 for each violation. Each day of violation shall constitute a separate violation.

3) Storm water relocation and treatment

The proposed revision would relocate the existing bubblers from the brow of the lake bank to the field adjacent to the canoe launch. Staff recommends approval with the following conditions:

a. Phase 6 of Lacamas Shores will not discharge into the existing bio-filter system.

b. Permittee shall make the improvements identified on the attached plans titled "Modifications to the Lacamas Shores Stormwater Disposal System", prepared by MacKay and Sposito Engineering and dated March, 1992. Refer to **Exhibit "J"**, construction drawings.

c. Storm water runoff shall, as a minimum, be monitored for three years in accordance with the following monitoring program:

Purpose of Program:

Ensure that storm water leaving the developed area has been

treated in accordance with best management practices (BMP's); and verify that the quality of storm water entering Lacamas Lake will not have an adverse impact.

Monitoring Program Objectives:

1. Measure hydrologic conditions of the ***Storm Water Treatment System (SWTS)*** to detect changes in its hydrology.

2. Document the quality of surface water and water moving through the soils and vegetation of the SWTS and the waters downstream to the lake.

3. Document changes in the condition of vegetation in the SWTS, and area downstream to the lake.

4. Develop criteria to evaluate data and determine if the SWTS is providing adequate treatment.

5. Identify the range of nutrient concentrations typically found in storm water runoff. Compare with runoff entering and exiting the SWTS.

6. Test for evidence of herbicides, pesticides and selected heavy metals.

Development of Criteria (#4 above);

1. Establish baseline criteria using existing information from monitoring reports of adjacent wetlands, first year results of the redesigned SWTS and control stream concentrations. Conduct sampling at high flow, low flow and first flush events. Baseline levels will be established by DOE with input from the relevant parties.

Parameter	Relative Criterion
* Nutrients (total phosphorus, soluble phosphorus, nitrate+nitrite -nitrogen)	* 2 standard deviations (SD)
* Sediment, pH, conductivity, (total suspended solids)	* 2 SD
* Metals (Cu,Zn)	* Wash. Water Quality Stds
* Organophosphate pesticides	* detection limit
* Chlorinated herbicides	* detection limit
* Chlorinated pesticides	* detection limit

2. Establish two transects and two plots to sample vegetation and monitor changes in distribution and health throughout the monitoring period.

Parameter	Relative Criterion
* Species composition	* 25% change
* Plant health	* obvious stress
* Plant senescence	* premature death of perennial

Monitoring Plan:

The water quality and vegetation monitoring plan remains in effect for three years commencing upon substantial completion of the SWTS. Substantial completion is upon construction of SWTS components and establishment of vegetation. The SWTS components include; distribution manhole, bio-swale, wet pond, filter strip, earthen berm and out flow piping.

Water:

Monitor the concentration of parameters at specific points flowing into and out of the SWTS. Measure parameters at 1) distribution manhole, 2) terminus of bio-swale, 3) outlet pipe to creek, and 4) lakes edge. Continue monitoring of control creeks - 1) Dwyer Creek, 2) & 3) Unnamed creeks on east shore.

Sample for identified parameters during high and low flow periods, the first flush episode following dry summer season, and early winter. Acquire at least one sample during each period, each year.

Vegetation:

Establish two vegetation transects, one in the bio-swale and one in the wet pond. Establish two vegetation plots, one along the bio-swale and one in the wet pond, along each transect. Sample to determine plant species and the respective percent of cover within each plot. Observe and note any species shifts or stress.

Regulatory Process:

The same regulatory process used with the existing bio-filtration system will be utilized with the proposed SWTS. The process is generally described below:

All initial and routine sampling is considered normal

evaluation. A report, showing the results of the monitoring plan, shall be provided to the Lacamas Shores Homeowner's Association, Clark County Citizens In Action, Dept. of Ecology and the City of Camas.

Stage 1
In the event a parameter violates its established criterion, a Stage 1 process is triggered. At this level regulatory agencies are notified of the exceedence. The relevant regulatory agencies discuss the nature of the exceedence with other relevant parties and determine whether further steps need to be taken. In the event no immediate action is required the monitoring program is resumed. In the event the exceedence suggests the need for further inquiry, a number of actions are possible, e.g. resampling the system, sampling at a finer scale, etc.

Stage 2
Stage 2 is an action level. At this point the problem is isolated and a plan is developed to remedy the situation. Based upon discussions with the parties of record, the appropriate contingency can be initiated. Action at this stage may include modification of vegetation, structure or soil, etc. The monitoring program then resumes to measure the effectiveness of the selected contingency.

Refer to **Exhibit "K"** for a flow diagram on Stage 1 and Stage 2 testing and remedial actions.

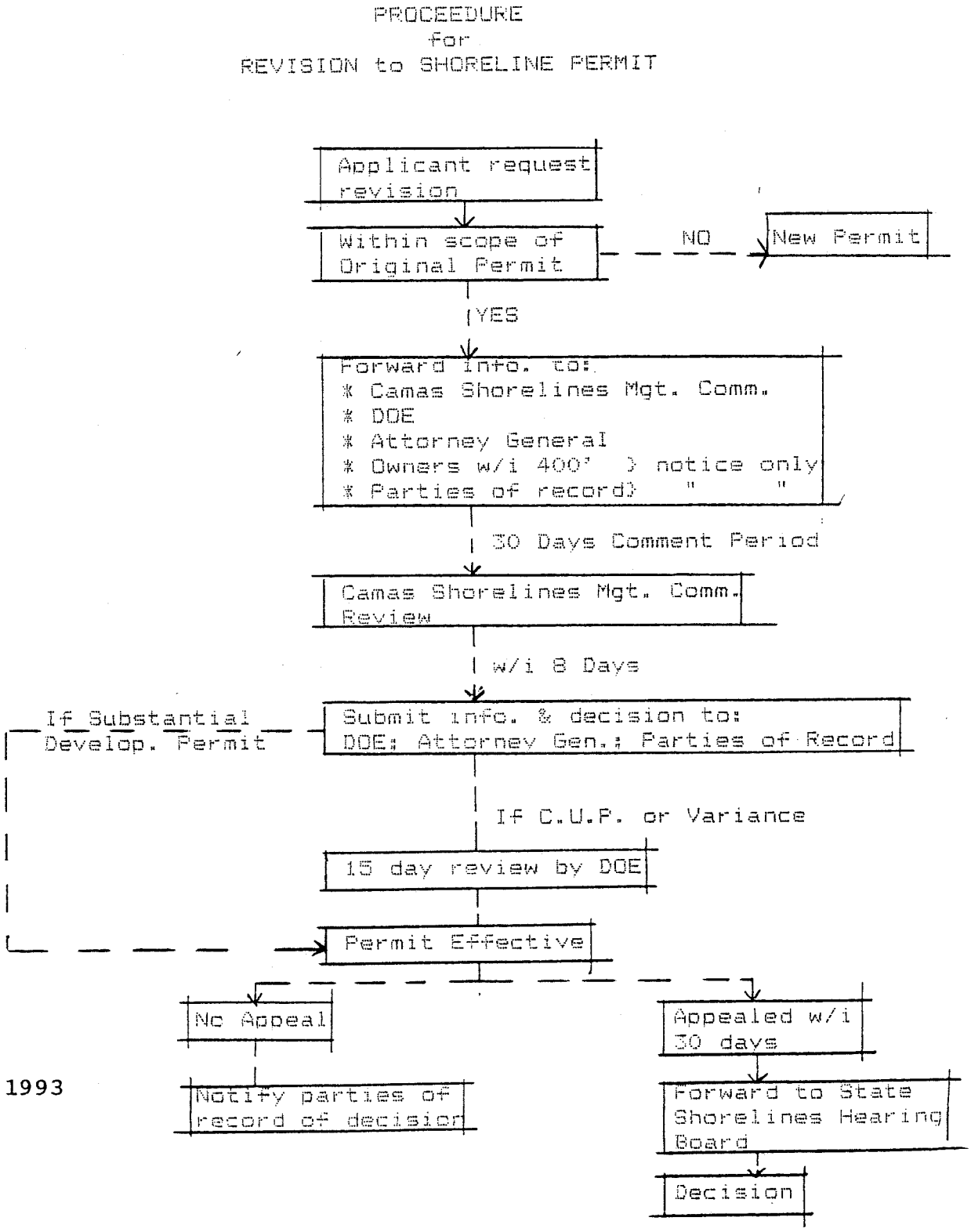
d. A multi-cell wet pond configuration, recommended in the **April 14, 1992**, letter from MacKay and Sposito Engr. to the City of Camas, is the identified contingency plan.

e. Vanport Mfg. shall sponsor a class to educate all homeowners on the history of lake clean up, effects of fertilizers and pesticides on the lake and how Lacamas Shores storm water is treated.

f. All work shall be done in accordance with the City of Camas Erosion Control Ordinance.

IV Process:

The following flow chart describes the shoreline permit revision process. The permit has been distributed to the City Shoreline Review Management Committee, DOE, Attorney Generals Office, and parties of record. Notices have been forwarded to owners within 400 feet of the development.



V Action:

The Shoreline Review Committee shall review and consider all comments received during the 30 day period and take action to accept, modify or deny the requested revision. The revision, if approved, will then be forwarded to DOE for review and action.

SECTION VI

LIST OF EXHIBITS

LACAMAS SHORES PERMIT REVISION
List of Exhibits

EXHIBIT "A":	Survey map showing conservancy zone overlap in relationship to private property and top of bank.
EXHIBIT "B":	Map of city ownership and dates of dedication.
EXHIBIT "C":	Aerial map of proposed one acre dedication.
EXHIBIT "D":	Determination on presence of wetlands in the proposed one acre dedication.
EXHIBIT "E":	List of owners agreeing to allow their property to be revegetated.
EXHIBIT "F":	Agreed Order of Remand.
EXHIBIT "G":	Conservancy environment criteria and management policies.
EXHIBIT "H":	Evaluation of the proposed bubbler/biofiltration/settling pond system at Lacamas Shores.
EXHIBIT "I":	Viewshed Plan for the conservancy zone at Lacamas Shores.
EXHIBIT "J":	Modifications to Lacamas Shores Stormwater Disposal System.
EXHIBIT "K":	Storm water monitoring plan regulatory process flow chart.

APPROXIMATE TOP OF BANK LINE PLOTTED FROM STORM SEWER CROSS SECTIONS AND AERIAL TOPOGRAPHY.

LACAMAS SHOREB PH - 6

TRACT A

EXHIBIT "A"

APPROXIMATE EDGE OF WATER

100' OFF SET FROM EDGE OF WATER

APPROXIMATE TOP OF BANK LINE PLOTTED FROM STORM SEWER CROSS SECTIONS AND AERIAL TOPOGRAPHY.

100' OFF SET FROM EDGE OF WATER

13 12 11 10 9 8 7 6 5 4 3 2 1

L A C A M A S S H O R E S P H - 4

19 20 23 24 25 26 27 TRACT "A"

18 21 22

17

L A K E R O A D

NOTE: THIS SURVEY ORIGINALLY DONE IN MARCH, 1992 IS REVISED THIS DATE TO SHOW THE APPROXIMATE TOP OF BANK ALONG THE NORTH LOT LINES OF LACAMAS SHORES PHASE'S 4 & 5.

RICHARD SPOSITO
STATE OF WASHINGTON
1393
REGISTERED
PROFESSIONAL LAND SURVEYOR
EXPIRES 12/28/

1/29/93

OWNERSHIP CONTINUES TO NW

1990 DEDICATION (7/90)

CITY OWNERSHIP

1989 DEDICATION (3/89)

1988 DEDICATION (1/89)

CITY PARK DEDICATED 1/89

EXHIBIT "B"

Z6-127791 SBG-MS-LACAMAS

EXHIBIT "C"

THE JD WHITE COMPANY INCORPORATED
Planning and Environmental Services

July 15, 1992

Tom Shipler
Lacamas Shores
P.O. Box 1009
Camas, WA 98607

Dear Tom:

Attached is the sketch map of the wetland/upland areas for the one-acre dedication you have proposed. At your request, we visited the subject site and verified that an upland area exists along the jogging oval that is approximately 50 feet wide. This map represents an approximate sketch of our findings.

We want to emphasize that we did not complete a delineation of the one-acre site and that the attached sketch is no more than an approximate representation of our observations on the site based on one field visit. It should not be used for any purpose other than approximating the area of upland and wetland within the one-acre site.

Please attach this letter to any copies of the sketch which you distribute. Thank you.

Sincerely,

The JD White Company, Inc.

Ramona Monroe

Ramona Monroe
Project Manager

RLM/bb

Enclosure

cc: John White

1111 Main Street ♦ Suite 300
Vancouver, WA 98660
(206) 696-1338
Portland (503) 286-9485
FAX (206) 696-9317

EXHIBIT "D"

THE JD WHITE COMPANY INCORPORATED

Planning and Environmental Services

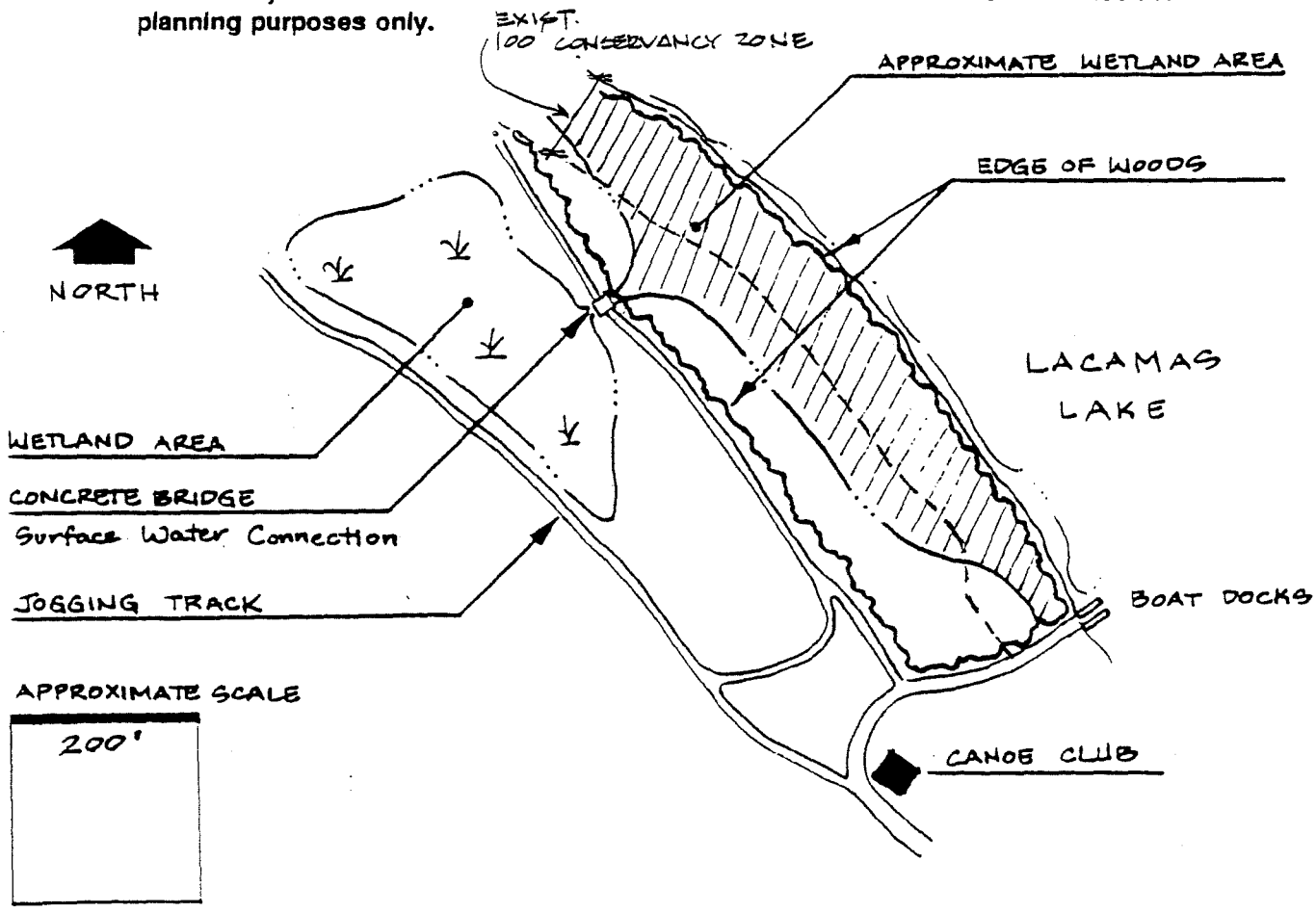
LACAMAS SHORES

A reconnaissance-level survey has been performed to determine the relative area of upland vs. wetland on a ± 3-acre portion of the Lacamas Shores property in Camas, Washington. The survey was performed on July 14, 1992. The subject site is located north of the Canoe Club, between Lacamas Lake and the jogging track. Because a wetland delineation was performed previously (1988) on the entire site, only a brief review of current site circumstances with respect to wetlands is presented here.

The approximate nonwetland/wetland boundary was determined using the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), which is the current technical guidance for making wetland determinations. The identified approximate wetland area (see sketch below) adjacent to Lacamas Lake meets all jurisdictional criteria for wetlands. This area is connected by a ditch to the previously identified wetland area to the west.

Areas not identified as wetlands on this sketch are uplands. The wooded area northeast of the jogging track and southeast of the concrete bridge (see sketch) has distinctly nonwetland vegetation. Dominant plants in this area include bigleaf maple, vine maple, snowberry, blackberry and bracken. One the basis of vegetation alone this area does not qualify as wetland.

NOTE: **This survey does not constitute a formal wetland delineation and should be used for planning purposes only.**



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(206) 696-1338
Portland (503) 286-9485

The undersigned property owners for Lacamas Shores agree to allow the revegetation of their property, either by themselves or by the Lacamas Lake conservancy zone.

RECEIVED
MAR 24 1993
PUBLIC WORKS

Name	Address/Lot #
Vanport	Lot 11-4, 11-5
Thor Leske	1945 N.W Lacamas Dr. Phase 5-7
Joan Collins	1631 N.W. Lacamas Dr. Phase 4-10 Lot
Lyle + Debbie Nelson	1551 NW Lacamas Dr. phase 4 lot 8
Tom & Carol Kelso	1707 NW Lacamas Dr. Phase 4- Lot 12
Scott Powell	2013 N.W. Lacamas Dr. Camas, Phase 5 lot 8
Bob & Cindy Wakefield	Lot 5, phase 5- 1919 N.W. Lacamas DR.
Jai & Kim Cho	Lot 5, Phase 6 1931 NW Lacamas Dr.
Craig Byrd tc/ Joan Collins	
Karen Stanley tc/ Joan Collins	Phase 4 Lot 14
Mohammad Shafiyyan tc Joan Collins	Phase 5 Lot 1

EXHIBIT "E"

Jessie & Sota Mikkola TC/Keijo — Lot 13 Phase 4, 1725 NW Lacamas Dr.

David & Deanna Collins TC/Keijo — Phase 5

~~[illegible]~~ Don Boehm TC/Chester Knapp — Lots 1 & 2, Phase 4

George Schmid TC/Chester Knapp — Lot 6 Phase 4, Lot 12 Phase 5

BEFORE THE SHORELINE HEARINGS BOARD
IN THE STATE OF WASHINGTON

CITIZENS TO SAVE LACAMAS LAKE, Appellants, vs. CITY OF CAMAS, VANPORT MANUFACTURING, Defendants.	NO. SHB 88-33 AGREED ORDER OF REMAND
CITIZENS TO SAVE LACAMAS LAKE, Appellants, vs. STATE OF WASHINGTON DEPARTMENT OF ECOLOGY, Defendants.	

COMES NOW the parties to the above action and enter into this Agreed Order of Remand under which it is mutually agreed that the Substantial Development Permit (City of Camas Permit No. 2-87) and Shoreline Conditional Use Permit (Camas Permit No. 590-14-7806) shall be remanded to the City of Camas to be reissued with the following instructions:

1. Provided that the necessary permits are issued,

EXHIBIT "F"

Vanport Manufacturing, Inc. (the "Developer"), agrees to complete by January 1, 1990, the construction of the public pedestrian trail located over the entire length of the project's shoreline, including the portion on the city park property donated by the Developer, all as depicted as the "public pedestrian trail" in the site plan attached hereto and made a part hereof as Exhibit A.

2. The Developer agrees to provide a letter of credit to the City of Camas to assure completion of the public pedestrian trail. Such financial assurance shall be in an amount agreed upon by the City of Camas and the Developer, and may be in the form of a decreasing term and revolving letter of credit based upon the portion of the trail yet to be completed.

3. The Developer agrees to dedicate to the City of Camas, should they accept it, a 100-foot conservancy zone along the shoreline of the development, excepting that portion of the conservancy zone which enters the wetland or the private access areas. This property is designated in Exhibit A as the "conservancy zone." The homeowner's association formed in the development shall continue to maintain the public pedestrian trail within the developer's property.

4. The Developer agrees to commit a portion of the property now reserved for potential wetland use to be developed immediately as part of the man-made wetlands created as part of the biofilter storm drainage system on the project. This additional property is depicted as the "newly-created wetlands"

on the site plan attached as Exhibit A. All other wetlands and land reserved for potential future wetlands shall continue to be governed by the conditions and monitoring program set forth in the existing permit conditions.

5. In consideration for the additional acreage contributed to the man-made wetlands, the developer shall have the right to reconfigure the lots in the existing site plan to obtain up to 218 residential lots in the development.

6. The water quality monitoring and contingency program contained within the existing permit conditions shall continue for the longer of five years commencing the date of the reissuance of the Substantial Development Permit and Conditional Use Permit or until such time that 75% of the lots depicted as "lots within biofilter drainage" on Exhibit A are developed.

7. The Developer and homeowner's association shall allow the members of the public to access the public trail through the private access designated as the "private access/permitted public access" in Exhibit A. The public shall be allowed access through this private access so long as such use does not contribute to such increased traffic, parking, congestion, vandalism or other nuisance that interferes with the quiet enjoyment of the homeowners residing in the development. The homeowner's association for the development shall have the right to petition either the City of Camas, Department of Ecology or Shoreline Hearings Board to present evidence that the public access is contributing to the disruption of the quiet enjoyment of the

Shoreline Administrator's Manual

First Edition, 1990

WASHINGTON STATE DEPARTMENT OF
ECOLOGY

Shorelands & Coastal Zone Management Program

October 1990
90-45b

EXHIBIT "G"

Management Policies

a. Preferred uses in the Conservancy Environment are those which are non-consumptive of the physical and biological resources of the area and activities and uses of a non-permanent nature which do not substantially degrade or alter the existing character of the areas. Non-consumptive uses are those uses which utilize resources on a sustained yield basis while minimally reducing opportunities for other existing and future uses of the resources of the area.

b. Activities and uses which would substantially degrade or permanently deplete the physical or biological resources of the area should be prohibited.

c. New development should be restricted to that which is compatible with the natural and biological limitations of the land and water and will not require extensive alteration of the land-water interface.

d. Development in the Conservancy Environment should be designed to protect the shore process corridor and its operating systems.

e. Activities or uses which would strip the shoreline of vegetative cover, cause substantial erosion or sedimentation or adversely affect wildlife or aquatic life should be prohibited.

f. Aquacultural, agricultural and recreational activities which will not be detrimental to the shoreline character and scenic quality, natural systems such as littoral drift and geo-hydraulic processes should be encouraged. Residential development should be severely restricted to protect such uses and features.

g. Commercial and industrial uses other than low intensity agricultural practices, commercial forestry and extraction of renewable sand, gravel and mineral resources should be prohibited.

h. Construction of structural shoreline stabilization and flood control works should be minimized. New developments should be designed to preclude the need for such works and should be compatible with shoreline characteristics and limitations.

i. Preservation of resources should have priority over public access recreation and development objectives whenever a conflict exists.

j. Developments within the Conservancy environment should be compatible with uses and activities in adjacent (including aquatic) environments.

Evaluation of the Proposed Bubbler/Biofiltration/Settling Pond System at Lacamas Shores, Camas Washington

Prepared for:
City of Camas
616 NE Fourth Avenue
P.O. Box 1055
Camas, Washington 98607

Prepared by:
Beak Consultants Incorporated
317 SW Alder St., Suite 800
Portland, Oregon 97204

September 1992

73584-

Evaluation of the Proposed Bubbler/Biofiltration System at Lacamas Shores, Camas, Washington

Project No. 73584

Prepared for:

City of Camas
616 NE Fourth Avenue
P.O. Box 1055
Camas, Washington 98607

August 1992

Prepared by:

Beak Consultants Incorporated
317 S.W. Alder St., Suite 800
Portland, Oregon 97204

John B. Collins, Ph.D., Project Manager

Kenneth L. Carlson, Associate

TABLE OF CONTENTS

1.0 INTRODUCTION

Lacamas Shores Development (Lacamas Shores) is a housing development that has been constructed on the south shore of Lacamas Lake. Beak was contracted by the City of Camas to evaluate the proposed bubbler/biofilter/settling pond system to be used to treat stormwater runoff (MacKay and Sposito 1992).

The bubbler/biofilter/settling pond system was proposed as a pollution reduction facility for additional stormwater runoff generated by new housing areas (Sposito and MacKay 1992). A similar biofiltration/wetland system without a settling pond was installed several years ago at Lacamas Shores. The efficiency of the biofilter/wetland has been monitored for surface water quality (Scientific Resources, Inc. (SRI) 1992). The results from the SRI report were important in determining the usefulness of a biofiltration system at Lacamas Shores. In addition, relevant information from recent scientific studies and regulatory guidance documents was referenced to support the conclusions found in this report.

2.0 FEASIBILITY OF THE PROPOSED BUBBLER/BIOFILTER SYSTEM

Biofiltration is a pollution control method that uses physical settling processes, chemical adsorption/precipitation (sorption), and biological uptake to reduce contaminant concentrations. Gravity filtration and chemical sorption are the most important mechanisms for pollutant removal for sediments and particulate-bound phosphorus. Though nitrogen transformations are mediated by biological and chemical factors, physical and chemical processes are especially critical in the Pacific Northwest where the period of major runoff coincides with the period of lowest biological activity.

There are several methods for treating stormwater runoff (Washington Department of Ecology 1992): (1) soil infiltration facilities, (2) constructed wetlands, (3) wet ponds, (4) wet vault/tanks, (5) extended detention dry pond with biofilter, (6) extended dry vault/tank with biofilter, (7) biofilters, and (8) natural wetlands. The proposed bubbler/biofilter/settling pond system uses several of the

methods for treating stormwater runoff in sequence. The strategy of the proposed bubbler/biofilter/settling pond system is to use the best attributes of each system in sequence to fully treat the stormwater runoff so that optimal removal efficiencies are obtained.

The feasibility and usefulness of the proposed bubbler/biofilter/settling pond system is determined primarily by the following factors: soil type, proximity to bedrock, sediment input, phosphorus removal capability, nitrogen removal capability, and design considerations. Each of these factors are examined in this section.

2.1 SOIL TYPE

The soils have been mapped as Hesson clay loam (*Clayey, kaolinitic, mesic Xeric Haplohumult*). The physical and chemical properties of a typical Hesson soil in Clark County, Washington are shown in Tables 1 and 2. The area may include native soil materials that have been moved from adjacent areas. The high percentage of 1:1 phyllosilicate clays (i.e., kaolinite and dickite) is not the optimal soil mineral clays for nutrient and metal retention. However, the cation exchange capacity is high. The high clay and colloidal content of the soil will overcome the mineralogical limitations. The long residence times provided by both the biofiltration system and the settling basin will allow for precipitation/adsorption reactions to be fully completed.

2.2 PROXIMITY TO BEDROCK

Bedrock is at a soil depth of greater than 60 inches. Proximity to bedrock will not affect the function of the bubbler/biofilter/settling system. Consideration of other remedial designs are not constrained by the soil depth.

2.3 SEDIMENT INPUT

The multiple removal strategies of the bubbler/biofilter/settling pond system will increase the removal efficiency and the capacity of the system to handle the predicted sediment inputs.

Table 1. Chemical Properties of Hesson Clay Loam (Clark County, Washington).

Soil Depth	Cation Exchange Capacity (meq/100 g)	Organic Carbon (%)	pH	Nitrogen (%)
0 to 8	30.7	5.24	5.0	0.329
12 to 22	16.0	0.8	5.4	0.053
30 to 40	17.2	0.27	5.1	0.048

Table 2. Physical Properties of the Hesson Clay Loam (Clark County, Washington).

Soil Depth	Texture (USDA)	Classification (Unified System)	Clay content (%)	Permeability (inches/hour)
0 to 8	Clay loam	ML	27.4	0.6 to 2.0
12 to 22	Clay	CH	34.8	0.2 to 0.63
30 to 40	Clay	CH	46.2	0.2 to 0.63

2.4 PHOSPHORUS REMOVAL CAPABILITY

The previously constructed wetland at the site removed phosphate associated with sediments, but was not efficient in removing soluble colloidal-bound phosphate. The addition of a settling pond to the system will increase soluble and colloidal-bound phosphate removal efficiency.

2.5 NITROGEN REMOVAL CAPABILITY

The previously constructed wetland at the site has performed very well (SRI 1992) in removing nitrogen from stormwater. The addition of the settling pond will increase removal efficiency.

2.6 DESIGN CONSIDERATIONS

The design of the biofilter system follows the suggested guidance (Stormwater Management Manual 1992) for optimal performance (Table 3). The settling basin is a redundant feature that will improve removal efficiencies.

3.0 PLANT MATERIALS

The primary function of the vegetation in the biofiltration system is to physically reduce stream velocity and increase residence time. A secondary, yet extremely important function of vegetation residing in the biofiltration system is to provide wildlife function and value. A site-specific planting plan for the proposed system was not provided with the extensive Preliminary List of Wetland Adjacent Upland Plants with Wildlife Value.

Table 4 lists several common grasses and their ratings for erosion protection. Tall fescue is rated as a superior ground cover. Bautista (1992) suggests that the "bioswale as proposed would in time develop into a wetland." Recent studies (EPA 1992) have shown that 96% of the vegetation in constructed wetlands in Oregon were the result of native vegetation. Thus, we suggest that planting be confined to ground cover in the biofilter system.

Table 3. Comparison of Suggested Design Criteria for Biofiltration Systems and the Proposed Design Criteria.

Factor	Suggested Criteria	Proposal	Meets Criteria
Slope Length	200 feet or greater	200 feet	Yes
Flow rate (maximum)	less than 5.0 fps	4.93 fps	Yes
Residence Time	greater than 20 minutes	greater than 20 minutes	Yes
Flow rate	less than 1.5 fps	1.07 fps	Yes

Table 4. Characteristics of grasses suitable for lining Puget Sound region biofilters.(a)

Common Name	Persistence/ Growth Form	Description	Rating (b)
Annual ryegrass or Italian ryegrass	Annual/bunchgrass	Common erosion control grass; establishes rapidly on bare soils but does not reseed well	3
Kentucky bluegrass	Perennial/sod-forming	Common turf grass; may require irrigation in dry season.	3
Reed canarygrass (c)	Perennial/sod-forming	Tolerates flooding and standing water; may require irrigation if dry.	3
Tall fescue	Perennial/bunchgrass	Common turf grass; can be used along; may require irrigation in dry season.	4
Western wheatgrass	Perennial/sod-forming	Tolerates drought	3

(a) Adapted from the Stormwater Management Manual (1991)
(b) Ratings are for erosion protection: 1 - fair; 2 - good; 3 - excellent; 4 - superior.

4.0 CONCLUSIONS

The bubbler/biofilter/settling pond system provides several redundant features that will ensure the water quality of Lacamas Lake. It is excellent system for remedying stormwater runoff from Lacamas development.

4.0 LITERATURE CITED

Bautista, Mark. 1992. Wetland Performance Review for Proposed Filter Strip and Bioswale at the Lacamas Shores Development, including Phosphorus Removal Potential.

Environmental Protection Agency. 1992. Evaluation of Constructed Wetlands in Oregon.

Scientific Resources. 1992. Five-Year Runoff and Wetland Biofilter Monitoring Program for the Lacamas Shores Residential Development. Camas, Washington.

Soil Conservation Service. 1972. Soil Survey of Clark County, Washington.

Sposito and MacKay. 1992. Lacamas Shores Storm Drainage.

Washington State Department of Ecology. 1991. Stormwater Management Manual for the Puget Sound Basin. Public Review Draft.

Viewshed Plan

Conservancy Zone
Lacamas Shores

Camas, Washington

Prepared by:

J. D. Walsh & Associates, Inc.
Landscape Architecture • Planning
1924 Broadway Street
Vancouver, Washington, 97663

June 1993

Exhibit I

Background

Lacamas Shores is an 86 acre planned residential neighborhood located on the south slopes of Lacamas Lake in Camas, Washington. (See figures 1 and 2).

As part of the overall plan, a conservancy zone paralleling the south shoreline was established. (See figure 2, Site Map). The intent was to preserve the natural character of the south shoreline while allowing public access by way of the Lacamas Heritage Trail for the purpose of recreational opportunities. In addition, it was the specific intent that view lots fronting onto the south edge of the conservancy zone be allowed to establish and preserve viewsheds consistent with appropriate care and management of the natural elements of the conservancy zone.

It is the general goal of the Viewshed Plan to provide guidelines for the establishment and management of viewsheds within the Lacamas Shores Conservancy Zone.

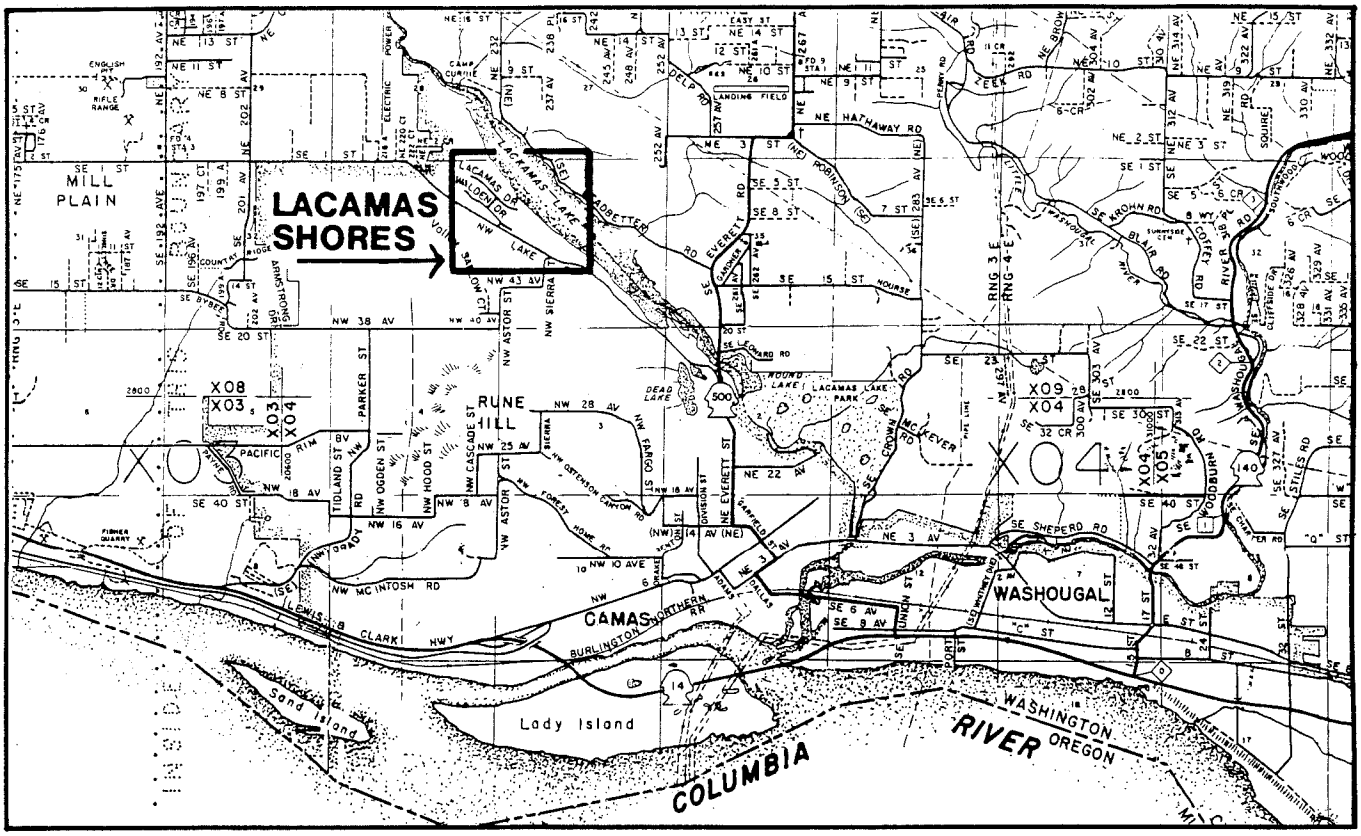


FIGURE 1

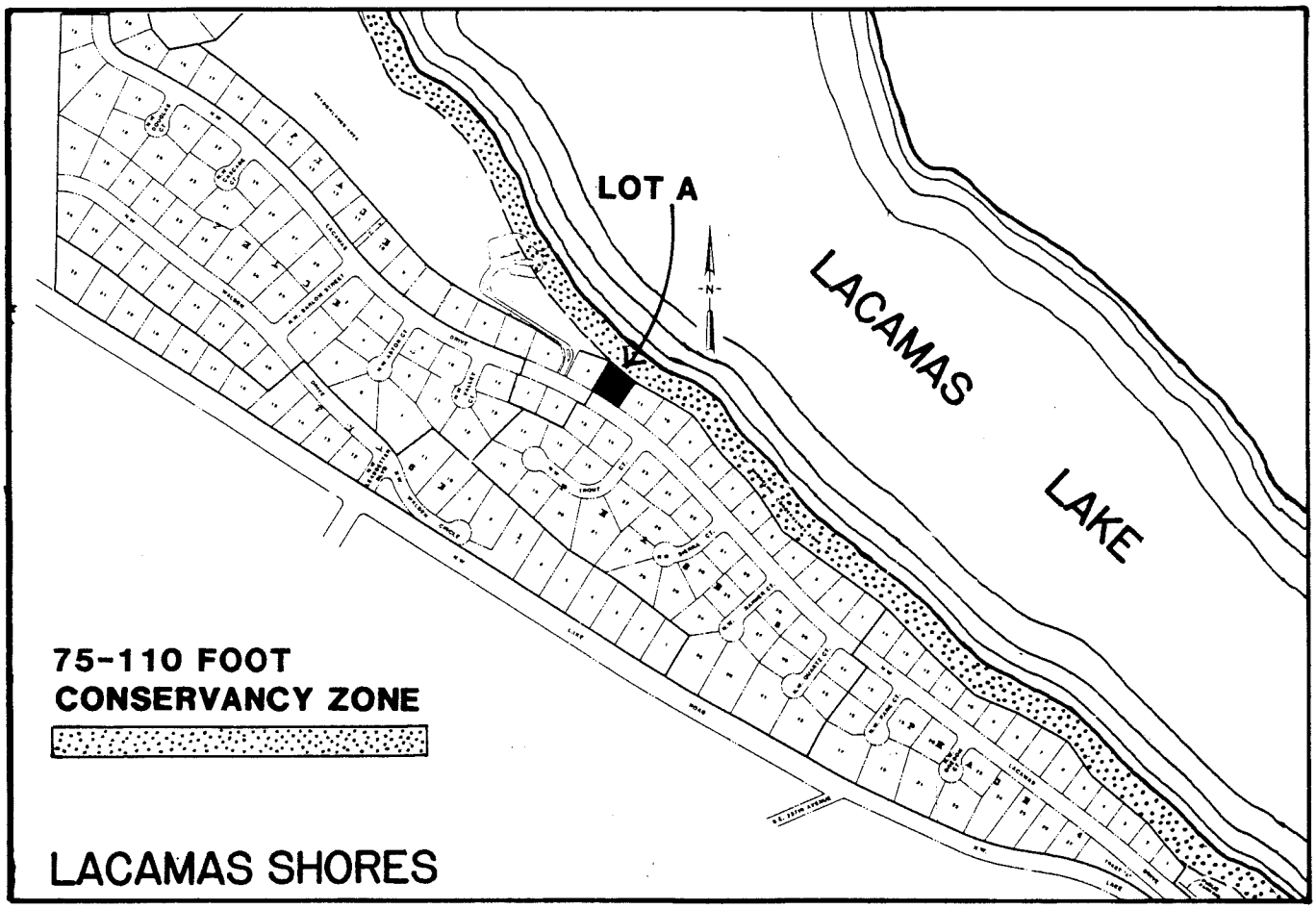


FIGURE 2

Conservancy Zone

Topography

The conservancy zone is a continuous linear strip of property stretching south approximately 75 to 110 feet from the ordinary high water line of Lacamas Lake. The eastern portion of the zone is steeply sloping, with a grade drop of approximately sixty feet from the top of the bank to the shoreline. In this area, the housing lots are immediately adjacent to the conservancy zone and in some cases, the steep slope continues some distance onto the northern portion of the lots.

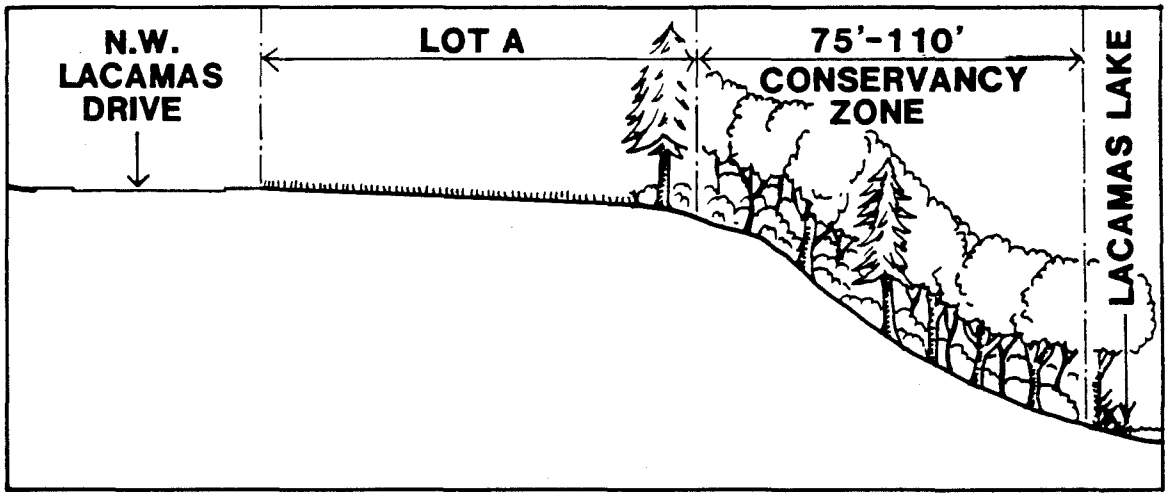
Vegetation

The existing vegetation within the Conservancy Zone is typical of Northwest riparian areas. There is a mix of deciduous and coniferous tree cover with openings of larger scale understory shrubs and of smaller scale trees. The north facing slope provides a shady, moist microclimate which promotes the growth of species favoring this type of environment. A partial listing of materials is included in the appendix. (See Exhibit B)

View Lots

Lot Type A

The lots with viewshed requirements are labeled Typical Lot A and noted in figure 5. These lots are immediately adjacent to the conservancy zone. A typical lot relationship to the zone is similar to the section illustrated in figure 3 below. Lots in this category are noted in figure 4.



SECTION (1" = 50')

FIGURE 3

Viewshed Definition

In order to establish a viewshed plan, it is important to define the nature and quality of specific view opportunities and to quantify the minimum obligations and expectations of the property owner. It should first be noted that the views afforded by different lots vary considerably. In general, type A lots have filtered views through existing conservancy zone vegetation that is growing immediately in the foreground of their view frame. (See figure 3.)

Depending on the lot location, this existing vegetation currently varies from a few scattered trees and no understory materials to a virtually solid screen of vegetation. The view potential from this type of lot is illustrated in figure 5. The views are noted as primary or secondary in nature and represent a typical condition. The view potential from various lots will vary but the minimal expectation of a property owner would be to establish and maintain one primary view and two secondary views. The primary view should be unobstructed. Secondary views would be obscured up to 30% by trees. It should be noted that the secondary views of Mt. Hood are not possible to attain from every lot due to topography and the presence of neighboring buildings.

Typical Lot Conditions

In order to illustrate typical view conditions and measures for establishing and maintaining views, a typical lot was selected. (See figure 4 for location.) The plan and section, shown in figures 6 and 7, illustrate the existing conditions and the relationship of topography and vegetation. In the subsequent illustrations, photographs of the view from the lot have been modified to illustrate the concept of establishing primary and secondary views. Although varying from lot to lot, the concept will remain similar to the illustrated views. This condition represents the minimal expectation of the property owner.

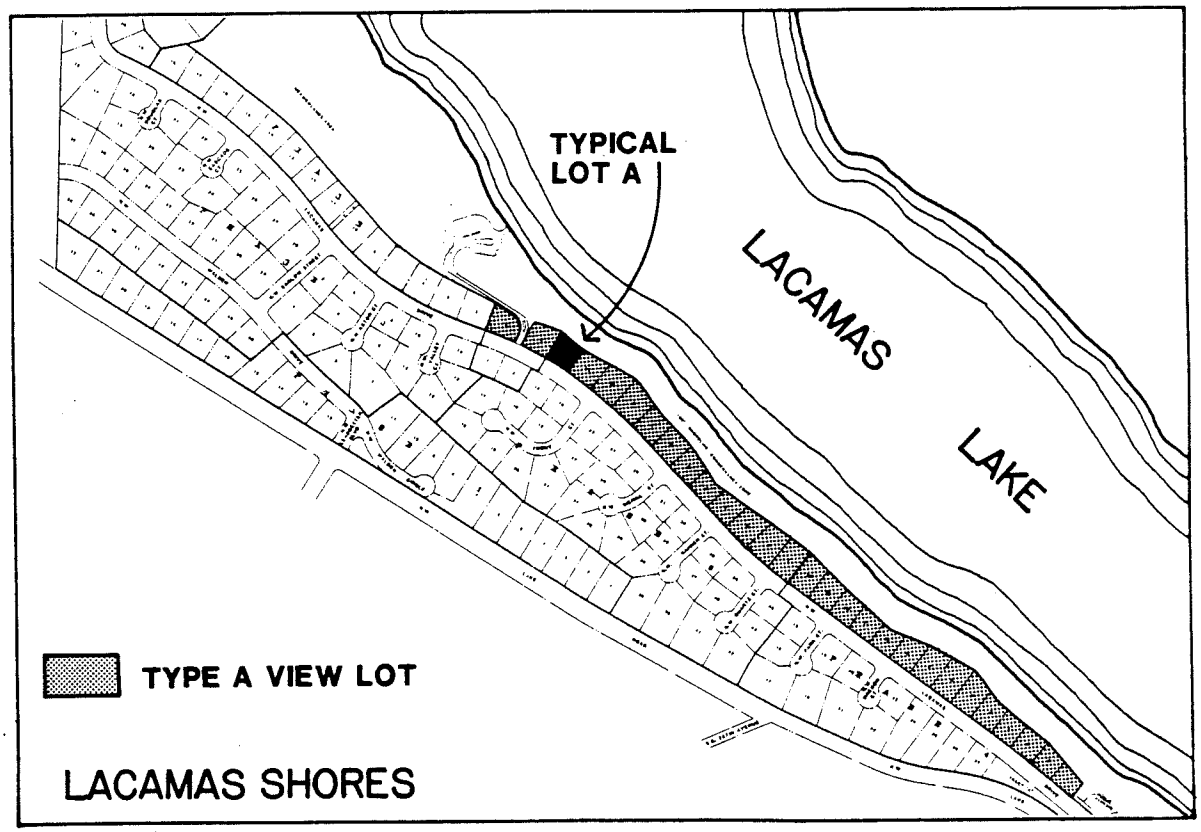
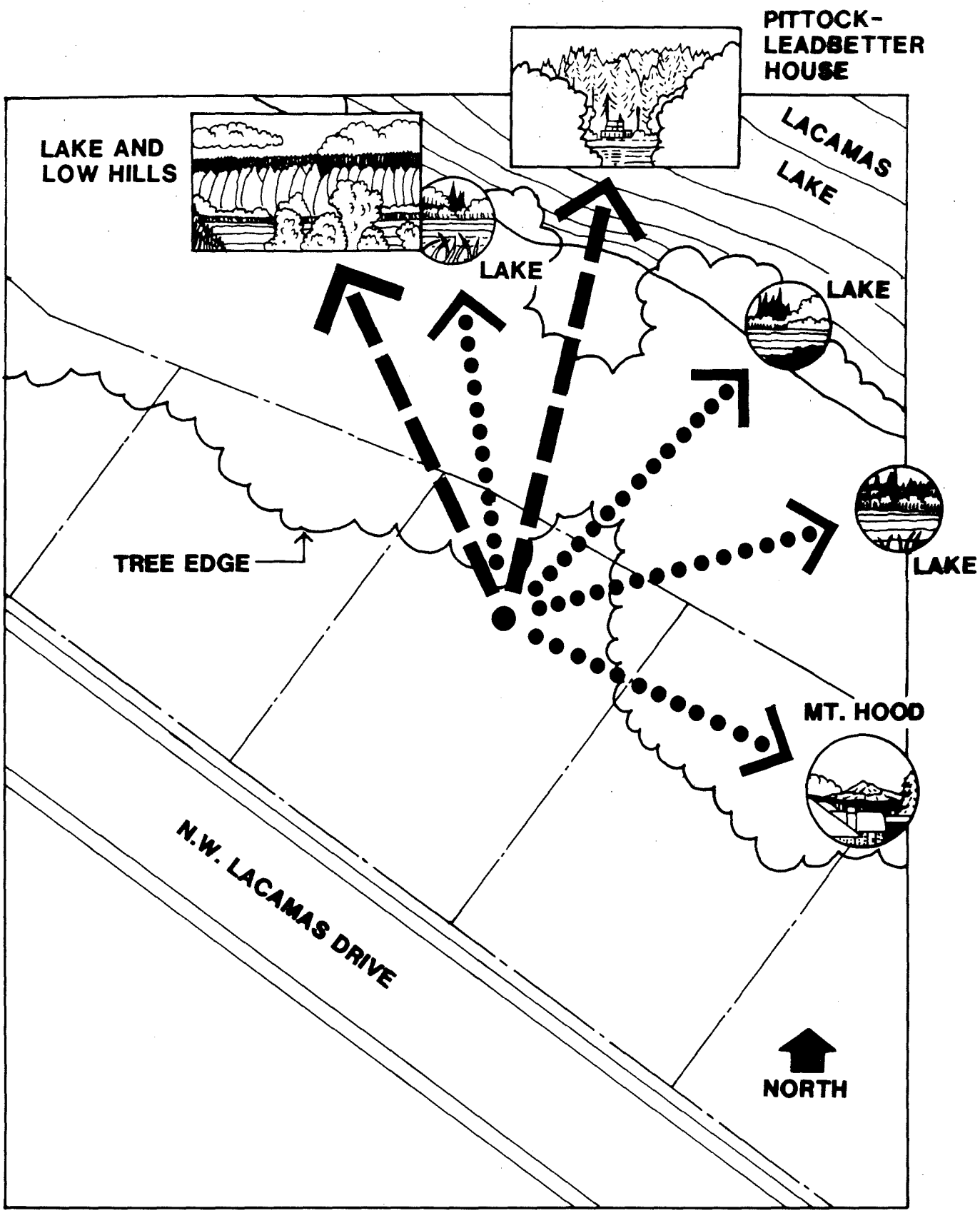


FIGURE 4

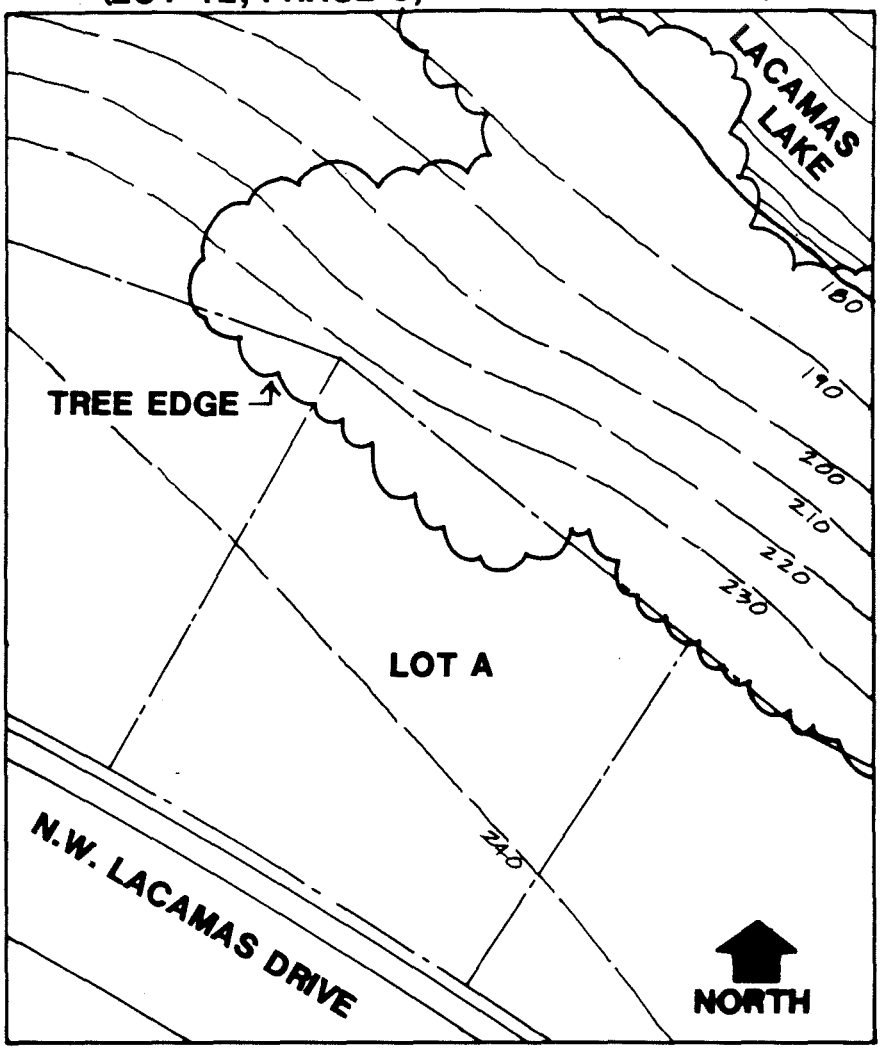


OPTIONAL VIEWS
FIGURE 5

PRIMARY VIEW

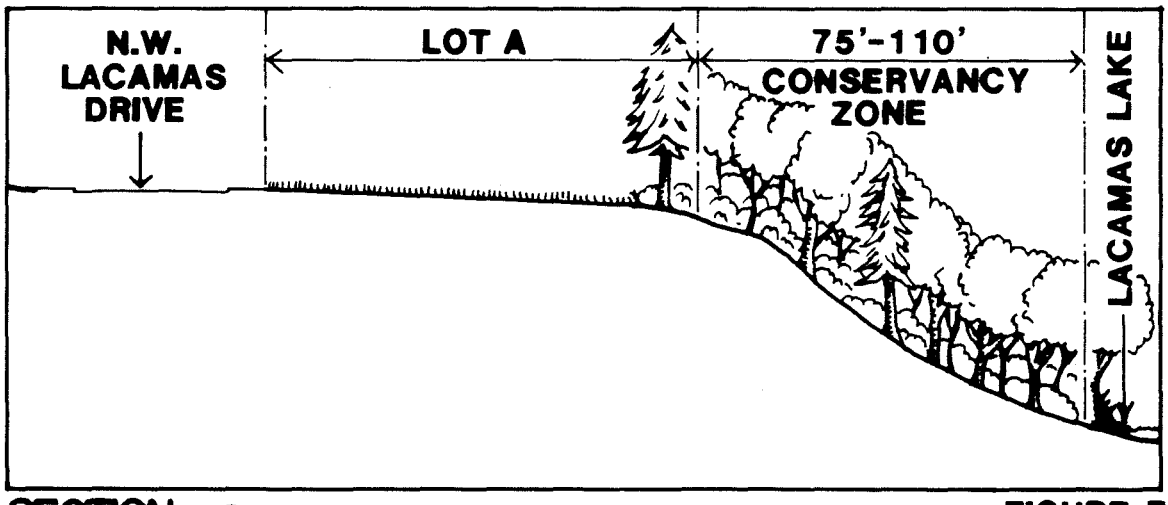
SECONDARY VIEW

TYPICAL LOT A
(LOT 12, PHASE 5, LACAMAS SHORES)



PLAN (1" = 50')
FIGURE 6

CONTOUR INTERVAL
10 FEET



SECTION (1" = 50')

FIGURE 7

TYPICAL LOT A

EXISTING CONDITION
FIGURE 8

POTENTIAL VIEWFRAMES
FIGURE 9

TYPICAL LOT A

EXISTING CONDITION
FIGURE 10

POTENTIAL VIEWFRAMES
FIGURE 11

PRIMARY AND SECONDARY VIEWS

Vegetation Management

Management of the existing vegetation will be required to establish and maintain the desired views. The homeowner shall be responsible for the maintenance and replacement of vegetation required to comply with the viewshed plan.

Removal of vegetation to establish and maintain the viewshed will require measures to prevent soil erosion of the disturbed areas and contamination of the lake. The following guidelines establish the conditions for initial removal, periodic pruning and replacement of plantings.

General Guidelines

- Large scale removal of vegetation to create a lot condition markedly different from the natural setting will not be allowed.
- Clearcutting of both trees and understory vegetation is prohibited.
  - Trees may be selectively pruned in accordance with the plan.
  - Low shrubs and groundcovers may be pruned or trimmed no closer than 2 feet to the ground
- Vegetation or trees within 50' of the water's edge may not be removed.

Tree Removal

- Removal of any tree or trees will require a written approval from the City of Camas shoreline administrator.
- Trees may be removed (with written approval) under the following conditions:
  - when they are less than 12 inches in diameter at breast height.
  - when they are diseased or a safety hazard (as determined by an approved tree expert).
- When a tree is removed, a stump with a minimum height of 3 feet shall be retained to provide slope stability.

Tree Replacement

- Trees removed within the conservancy zone shall be replaced with trees designated for each area in accordance with the approved species list. (See Exhibit B.)
- Replacement of trees will be equivalent to 1.5 times the diameter of the removed tree. For example:
  - 12" diameter-replace with twelve 1.5" diameter trees, or eighteen 1" diameter trees, etc.
  - 18" diameter- replace with eighteen 1.5" diameter trees or twenty-seven 1" diameter trees, etc.

Limbing, Thinning and Pruning of Trees and Understory Vegetation

- Removal of limbs over 6" in diameter requires written approval by the City of Camas shoreline administrator. In non-typical situations, a registered landscape architect or other qualified professional may be required to make a determination. The cost of such service will be the responsibility of the homeowner requesting the action.
- All pruning shall follow National Arborist Association standards (as identified by Exhibit "A").
- Coniferous trees may not be topped, but can be limbed or pruned to obtain a primary or secondary view of the lake and/or of the opposite shore (as shown in figures 6, 9, and 11).
- Deciduous trees should be selectively trimmed rather than topped whenever possible. Topping is only permitted when selective thinning or limbing is not practicable.
- All branches and limbs resulting from thinning operations that are larger than 2 inches maximum diameter and over 6 feet long shall be removed from the site.
- Exposed and/or damaged areas shall be replanted with native vegetation suitable for the situation in order to re-establish plant cover. (See Exhibit B for plantings).

New Planting Requirements

- Erosion Control
  Areas disturbed due to construction activities shall be stabilized immediately by party responsible for damage. Stabilization may be done with one of the following methods: reseeding, replanting, erosion matting or other methods approved by the city.
- Plant Types
  Comply with Exhibit B regarding preferred planting types for appropriate location and natural setting.
- Plant Materials
  - Name and variety: Provide plant materials true to name and variety established by American Joint Committee on Horticulture Nomenclature "Standardized Plant Names," Second Edition, 1942.
  - Quality:
    - Δ Provide trees, shrubs and other plants that comply with the recommendations and requirements of ANSI Z60.1, "Standard for Nursery Stock" and as further specified. Cold storage plants are not acceptable.
    - Δ Sizes: provide trees and shrubs of the sizes shown.
    - Δ Plants shall not have cuts over 3/4" diameter which have not completely healed over. Leader shall be intact on all plants.
    - Δ Potted and container stock plants shall have been grown in the containers for a minimum of six months and a maximum of two years. Root ball shall fill the containers but show no evidence of being rootbound.
    - Δ The city representative reserves the right to inspect plant materials for compliance with requirements for name, variety, size and quality. A minimum of 30% of the plant inventory shall be labeled with name, variety and source. Plants not meeting standards or not grown under similar climatic conditions of the project will be rejected. Rejected plants shall be marked and removed immediately from the site.
- Installation
  Trees are to be planted and staked according to detail shown in Exhibit B.
- Maintenance
  - Maintain plants for a minimum period of one year as follows:
    - Δ Maintain trees, shrubs and groundcovers by watering, pruning, cultivating and weeding as required for healthy growth.
    - Δ Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required.
    - Δ Cultivate to remove all weeds from planting area. Remove dead weeds and dispose legally off-site.
- Inspection and Acceptance:
  - When the project is completed, including maintenance, the city administrator will make an inspection to determine acceptability.
  - Where inspected landscape work does not comply with the requirements, replace rejected work and continue specified maintenance until reinspected.
- Warranties:
  - Guarantee trees, shrubs and groundcovers for a period of one year.
  - Within the first 60 days after installation, replace any new trees and understory vegetation that are unhealthy, vandalized, damaged or missing.
  - Remove and replace trees, shrubs and groundcover found to be missing, dead, winter killed, vandalized or in unhealthy condition during and at the end of warranty period. All replacement work shall be made within 30 days after receiving notification, weather permitting. In the event the property owner or responsible party does not make repairs accordingly, the city administrator without further notice, may provide materials and labor to make such repairs at the expense of the owner or responsible party.

Appendix

EXHIBIT A

NATIONAL ARBORIST ASSOCIATION

Pruning Standards For Shade Trees

(Revised 1979)

These standards are provided by the National Arborist Association to assist you in writing contract specifications. N A A. member companies are highly qualified to accomplish the pruning in compliance with the specifications that best satisfy your budget and other needs. It is recognized that regional practices may dictate variations in this standard.

W. P. LANPHEAR, Chairman
Standard Practices Committee

INTRODUCTION

Pruning is to be performed by tree workers who, through related training and on-the-job experience, are familiar with the techniques and hazards of this work including trimming, maintenance, repairing or removal, and equipment used in such operations. The use of climbing spurs or irons is not approved in pruning operations on live trees. This type of work is a potentially hazardous occupation and is to be undertaken only by trained personnel or under the supervision of trained personnel, all of whom are covered with workers compensation, property damage, public liability and completed operations insurance.

There are four classes of pruning:

CLASS I FINE PRUNING

Fine pruning shall consist of the removal of dead, dying, diseased, interfering, objectionable, obstructing, and weak branches, as well as selective thinning to lessen wind resistance. The removal of such described branches is to include those on the main trunks, as well as those inside the leaf area. An occasional branch, up to 1.2" diameter, as described above, may remain within the main leaf area to its full length when it is not practical to remove it.

The following specifications shall apply:

a. All cuts shall be made sufficiently close to the trunk or parent limb, without cutting into the branch collar or leaving a protruding stub, so that closure can readily start under normal conditions. (See diagram A) Clean cuts shall be made at all times

b. It is necessary to precut branches too heavy to handle to prevent splitting or peeling the bark. Where necessary, to prevent tree or property damage, branches shall be lowered to the ground by proper ropes or equipment.

c. Remove the weaker or least desirable of crossed or rubbing branches. Such removal should not leave large holes in the general outline of the tree.

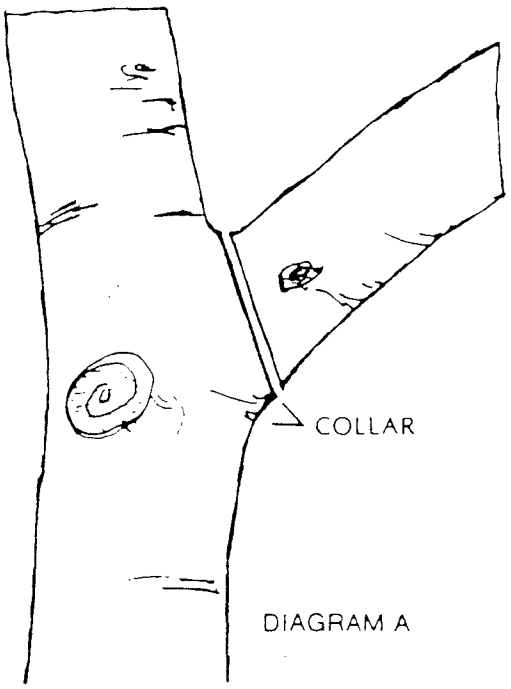


DIAGRAM A

e. On trees known to be diseased, tools are to be disinfected with methyl alcohol at 70% (denatured wood alcohol diluted appropriately with water) or Chlorox solution after each cut and between trees where there is known to be a danger of transmitting the disease on tools.

f. Old injuries are to be inspected. Those not closing properly and where the callus growth is not already completely established, should be traced where appropriate. If desired, for cosmetic purposes, the wound may be treated with a thin coat of wound dressing

g. Where practical, all visible girdling roots shall be treated as follows:
   1. Cut root at either end.
   2. Notch root in center with a chisel.
   3. Remove entire root without injuring the bark or parent stem.

h. The presence of any structural weakness, disease conditions decayed trunk or branches, split crotches or branches, should be reported in writing to a supervisor and/or the owner, and corrective measures recommended.

CLASS II MEDIUM PRUNING

Medium pruning shall consist of the removal of dead, dying, diseased, interfering, objectionable and weak branches on the main trunks as well as those within the leaf area. An occasional branch up to one inch in diameter may remain within the main leaf area where it is not practical to remove it.

The following specifications shall apply:

a. All cuts shall be made sufficiently close to the trunk or parent limb, without cutting into the branch collar or leaving a protruding stub, so that closure can readily start under normal conditions. (See diagram A) Clean cuts shall be made at all times.

b. It is necessary to precut branches too heavy to handle to prevent splitting or peeling the bark. Where necessary, to prevent tree or property damage, branches shall be lowered to the ground by proper ropes or equipment.

c. Treatment of cuts and wounds, with tree wound dressing, is optional except where open wounds in certain trees may attract insects that carry disease or allow fungus invasion. If such treatment is made, materials non-toxic to the cambium layer must be used, and care taken to treat only the exposed wood with a thin coat of dressing.

d. On trees known to be diseased, tools are to be disinfected with methyl alcohol at 70% (denatured wood alcohol diluted appropriately with water) or Chlorox solution after each cut and between trees where there is known to be a danger of transmitting the disease on tools.

e. Old injuries are to be inspected. Those not closing properly and where the callus growth is not already completely established should be traced where appropriate. If desired, for cosmetic purposes, the wound may be treated with a thin coat of wound dressing.

f. All girdling roots visible to the eye are to be reported to a supervisor and/or the owner.

   The presence of any structural weakness, disease conditions, decayed trunk or branches, split crotches or branches, should be reported in writing to a supervisor and/or the owner, and corrective measures recommended.

CLASS III COARSE PRUNING

Coarse pruning shall consist of the removal of dead, diseased or obviously weak branches, two inches in diameter or greater.

The following specifications shall apply:

a. All cuts shall be made sufficiently close to the trunk or parent limb, without cutting into the branch collar or leaving a protruding stub, so that closure can readily start under normal conditions. (See diagram A) Clean cuts shall be made at all times.

b. It is necessary to precut branches too heavy to handle to prevent splitting or peeling the bark. Where necessary, to prevent tree or property damage, branches shall be lowered to the ground by proper ropes or equipment.

c. Treatment of cuts and wounds, with tree wound dressing is optional except where open wounds in certain trees may attract insects that carry disease or allow fungus invasion. If such treatment is made, materials non-toxic to the cambium layer must be used, and care taken to treat only the exposed wood with a thin coat of dressing.

d. On trees known to be diseased, tools are to be disinfected with methyl alcohol at 70% (denatured wood alcohol appropriately diluted with water) or Chlorox solution after each cut and between trees where there is known to be a danger of transmitting the disease on tools.

e. The presence of any structural weakness, disease conditions, decayed trunk or branches, split crotches or branches, should be reported in writing to a supervisor and/or owner and corrective measures should be recommended.

CLASS IV CUTTING BACK OR DROP CROTCH PRUNING

Cutting back or drop crotch pruning shall consist of the reduction of tops, sides, underbranches or individual limbs. This practice is to be undertaken only in cases of utility line interference, or where certain portions of the roots or root systems have been severed or severely damaged, or when there is unusual and rapid tree growth, where it is necessary to reduce the top sides or underbranches, or for specific topiary training or dwarfing.

The following specifications shall apply:

a. All cuts shall be made sufficiently close to the trunk or parent limb, without cutting into the branch collar or leaving a protruding stub, so that closure can readily start under normal conditions. (See diagram A) Clean cuts shall be made at all times.

b. It is necessary to precut branches too heavy to handle to prevent splitting or peeling the bark. Where necessary, to prevent tree or property damage, branches shall be lowered to the ground by proper ropes or equipment.

c. Remove the weaker or least desirable or crossed or rubbing branches. Such removal should not leave large holes in the general outline of the tree.

d. Treatment of cuts and wounds, with tree wound dressing, is optoinal except where open wounds in certain trees may attract insects that carry disease or allow fungus invasion. If such treatment is made, materials non-toxic to the cambium layer must be used, and care taken to treat only the exposed wood with a thin coat of dressing.

e. Old injuries are to be inspected. Those not closing properly and where the callus growth is not already completely established should be traced where appropriate. If desired, for cosmetic purposes, the wound may be treated with a thin coat of wound dressing.

f. Generally, in reducing size (cutting back), not more than one-third of the total area should be reduced at a single operation. When cutting back trees, only drop crotch as much as necessary. Where practical, avoid cutting back to small suckers. All effort should be made to cut back to a lateral, one-third of the diameter of the cut being made.

g. In reducing overall size, attention is to be given to the symmetrical appearance. Top is to be higher and sides reduced in order to maintain a tree-like form.

h. When cutting back trees, one should have in mind to make them shapely and typical of their species.

i. On thin bark trees, just enough limbs shall be removed to get the effect wanted without admitting too much sunlight to the trunk of the tree or the top of large branches. Care should be taken with the following species: Lindens, maples, beeches, apple, oaks, and other trees susceptible to sunscald, growing in different geographical areas. The above damage may be minimized by doing work on susceptible species during the dormant season.

j. In lifting the lower bottom branches of trees for underclearance, care should be given to symmetrical appearance, and cuts should not be made so large that they will prevent normal sap flow.

k. Periodical drop crotching or cutting back of silver maples, poplars, and other trees with brittle and soft wood is an established practice and has proven beneficial in maintaining the safety of these trees over long periods of growth. Other trees with soft and brittle wood growing in different geographic areas may be specifically named when it is common practice to control the growth by cut-back.

l. An alternate method in some situations for maintaining the safety of these trees would be cabling and bracing as described under that standard

TERMINOLOGY

BRANCH COLLAR — Wood tissue that forms around the base of a branch between the main stem and the branch. Usually as a branch begins to die the branch collar begins to increase in size.

CALLUS — New growth made by the cambium layer around all of a wound.

CAMBIUM LAYER — Growing point between the bark and sapwood.

CLOSURE — Refers to the roll of the callus growth around the wound area.

THE CUT — The exposed wood area that remains after the branch has been removed.

CUT BACK — Specified reduction of the overall size of the tree or individual branches, but may include the overall reduction of the sides as well as the top of the tree.

DORMANT — A condition of non-active growth. Decidious trees are considered to be dormant from the time the leaves fall until new foliage begins to appear.

GIRDLING ROOTS — Located above or below ground level, whose circular growth around the base of the trunk or over the individual roots applies pressure to the bark area, thereby choking or restricting the flow of sap.

LIFTING — The removal of lower branches for underclearance.

PARENT STEM — The main trunk system of the tree.

PRECUT or PRECUTTING — The removal of the branch at least 6" beyond the finished cut, to prevent splitting into parent stem or branch.

PRUNING — The removal of dead, dying, diseased, live interfering, objectionable and weak branches in a scientific manner.

SAP FLOW — The definite course assumed by sap in its movement through a tree.

SCARS or INJURIES — Natural or man-made lesions of the bark in which wood is exposed.

SUCKERS — Abnormal growth of small branches usually not following the general pattern of the tree.

THINNING OUT — The removal of live branches to reduce wind resistance and to create more space.

TOPPING — Means the same as Cut Back.

TRACING — Careful cutting of the bark along the lines of sap flow to encourage closure and to be the outline of the wound area.

TRIMMING: — The same as pruning.

National Arborist Association
174 Rt. 101, Bedford, N.H. 03102

EXHIBIT B
Plant List

Trees

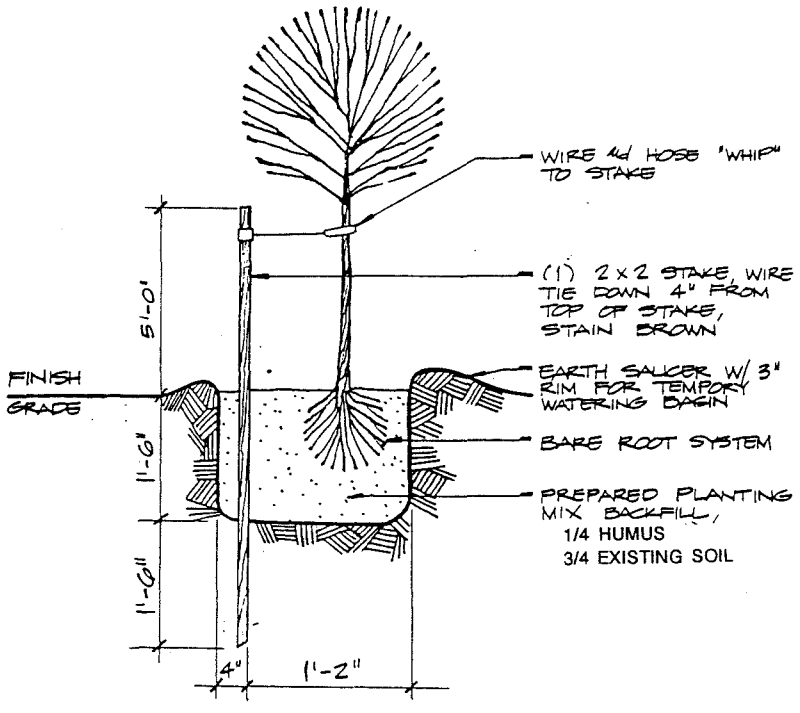
Common Name	Botanical Name	Minimum Size
Riparian (Moist shady lakeside zone)		
Big Leaf Maple	Acer macrophyllum	5'-6'
Red Alder	Alnus rubra	5'-6'
Oregon Ash	Fraxinus latifolia	5'-6'
Douglas Hawthorne	Crataegus douglasii	5'-6'
Vine Maple	Acer circinatum	5'-6'
Western Hazelnut	Corylus cornuta californica	5'-6'
Western Crabapple	Pyrus fusca	5'-6'
Hemlock	Tsuga heterophylla	3'-4'
Pacific Yew	Taxus brevifolia	3'-4'
Western Red Cedar	Thuja plicata	3'-4'
Open Sun (Upper slope)		
Big Leaf Maple	Acer macrophyllum	5'-6'
Pacific Madrone	Arbutus menziesii	5'-6'
Vine Maple	Acer circinatum	3'-4'
Wild Cherry	Prunus sp.	5'-6'
Douglas Fir	Pseudotsuga menziesii	3'-4'

Shrubs

Riparian (Moist shady lakeside zone)		
Salmonberry	Rubus spectabilis	1 gal.
Thimbleberry	Rubus parviflorus	1 gal.
Red-osier Dogwood	Cornus stolonifera	1 gal.
Red Currant	Ribes sanguineum	1 gal.
Indian Plum	Osmaronia cerasiformis	1 gal.
Open Sun (Upper slope)		
Elderberry	Sambucus sp.	1 gal.
Ninebark	Physocarpus capitatus	1 gal.
Oregon Grape	Mahonia aquifolium	1 gal.
Salal	Gaultheria shallon	1 gal.
Snowberry	Symphoricarpus albus	1 gal.
Serviceberry	Amelanchier alnifolia	1 gal.
Oceanspray	Holodiscus discolor	1 gal.
Nootka Rose	Rosa nutkana	1 gal.
Understory Shade (Upper slope)		
Oregon Grape	Mahonia aquifolium	1 gal.
Salal	Gaultheria shallon	1 gal.
Indian Plum	Osmaronia cerasiformis	1 gal.

Low Shrubs / Groundcovers

Common Name	Botanical Name	Minimum Size
Riparian (Moist shady lakeside zone)		
Western Buttercup	Ranunculus occidentalis	1 gal.
Lady Fern	Athyrium filix-femina	1 gal.
Deer Fern	Blechnum spicant	1 gal.
Wood Strawberry	Fragaria vesca bracteata	1 gal.
Open Sun (Upper slope)		
Kinnikinnick	Arctostaphylos uva-ursi	1 gal.
Salal	Gaultheria shallon	1 gal.
Understory Shade (Upper slope)		
Deer Fern	Blechnum spicant	1 gal.
Sword Fern	Polystichum munitum	1 gal.
Lady Fern	Athyrium filix-femina	1 gal.
Long Leaf Mahonia	Mahonia nervosa	1 gal.
Wild Ginger	Asarum caudatum	1 gal.
Oregon Oxalis	Oxalis oregona	1 gal.
Wood Strawberry	Fragaria vesca bracteata	1 gal.

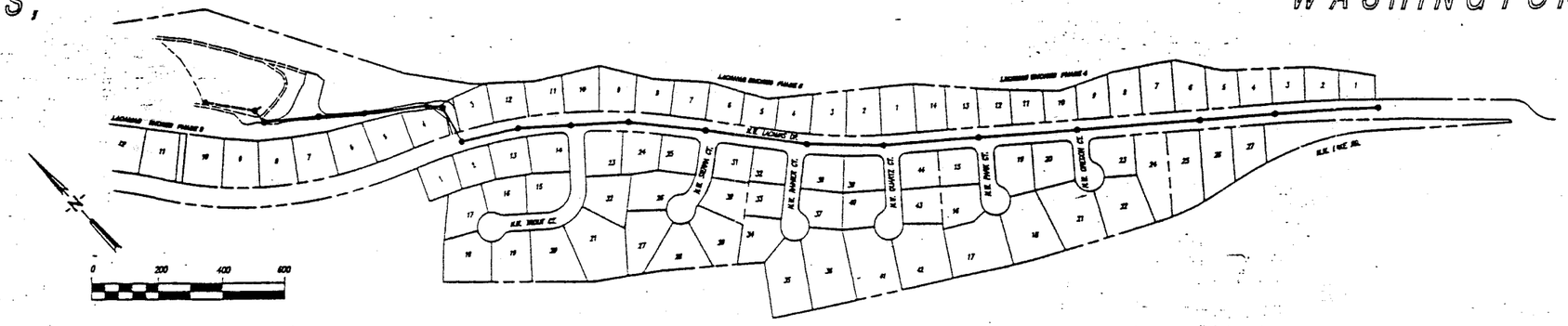


TREE PLANTING AND STAKING DETAIL
NOT TO SCALE

MODIFICATIONS TO LACAMAS SHORES

STORMWATER DISPOSAL SYSTEM

CAMAS, WASHINGTON



GENERAL NOTES

1. All work shall be done in accordance with the Standard Specifications and Construction Details of the City of Camas, Washington, and the 1991 Joint W.S.D.O.T./A.P.W.A. Standard Specifications and Details with A.P.W.A. Amendments.

2. Storm mains and laterals shall be constructed of P.V.C. pipe (A.S.T.M. D-3034) with approved granular backfill and bedding.

3. Underground utilities shown on these plans were located by the individual utility companies or jurisdictions in response to a "Design Locate" requested by Mackay & Sposito, Inc., through Clark County Utility Coordinating Council's "One Call" service (696-4848). Design locate requested February 11, 1992, Ticket No.: 12,523 and 17,348. The following utility located paint marks were observed in the field by Mackay & Sposito, Inc.:

Columbia Cable	Northwest Natural Gas
Clark Public Utilities (electric)	City of Camas (water)
G.T.E. (telephone)	City of Camas (sanitary sewer)

In accordance with RCW 19.122 "Underground Utilities", the Contractor, prior to commencing any excavation, shall provide notice of the scheduled excavation to all owners of underground facilities by calling the Clark County Utility Coordinating Council's "One Call" service 696-4848. The notice shall be given to the owners of the facilities not less than two business days or more than 10 business days before excavation.

4. The Contractor shall not excavate over four feet in depth without using adequate safety measures. The Contractor is referred to Title 296 WAC, Part N for excavation, trenching and shoring requirements.

5. All existing curb inlets, combination curb inlets and catch basins located in vicinity of the project shall be protected by straw bales and cleaned frequently for sediments.

6. Erosion control fencing shall be placed as shown on this plan. Fences shall be inspected by the Contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

7. Gravel construction entrances shall be installed and maintained at the end of paved parking near the storm outlet. Additional measures may be required to ensure that all paved areas are kept clean for the duration of the project.

8. All the erosion/sedimentation control facilities must be constructed prior to construction activities, and in such a manner as to ensure as much as practically possible that sediment-laden water does not enter the drainage system or violate applicable water standards.

9. The ESC facilities shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these ESC facilities shall be upgraded as needed for unexpected storm events and to ensure as much as practically possible that sediment-laden water does not leave the site or damage existing drainage systems.

10. Excess excavated material from trenches and outlet construction shall be hauled off the site to the location determined by the Developer.

11. The graded area between the bubbler outlet and the interception ditch shall be hydro-seeded with the following seed mixture:

42% Perennial rye	20% Reed Canarygrass
30% Winter Rye	8% Clover

The application rate shall be as follows:

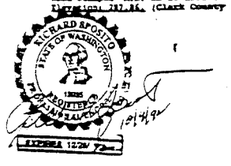
5 lb./1000 S.F.	Seed Mix
7 lb./1000 S.F.	10-20-20 (N-P-K) Fertilizer
50 lb./1000 S.F.	Wood Cellulose Fiber Mulch

12. Any runoff shall be diverted (if possible) during the period of vegetation establishment. This means that all existing outfalls shall be functioning until vegetation is fully established. Contractor shall plug existing storm outfalls at manholes after this period.

13. All trench repairs in N.W. Lacamas Drive shall be done in accordance with these plans and details and shall be finish grooved using an infrared machine to seal seams.

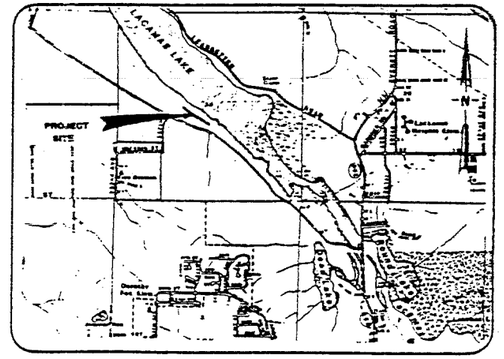
14. BENCHMARKS: 1. 2" brass disc on top of curb at S.W. corner of intersection of N.W. Lacamas Drive and N.W. Barlow Street stamped "N.E. B.M.-25 1992". Elevation: 231.26. (Clark County Datum)

2. 2" Brass disc on top of curb at S. nose of median island at intersection of N.W. Lacamas Drive and N.W. Lake Road stamped "N.E. BM-26 1992". Elevation: 197.86. (Clark County Datum)



LEGEND

	PROPOSED	EXISTING
STORM SEWER	———	——— Sto ———
STORM MANHOLE	●	●
STORM CLEANOUT	● C.O.	○ C.O.
COMBINATION CURB INLET	C.C.I.	C.C.I.
CATCH BASIN	C.B.	C.B.
CURB INLET	C.I.	C.I.
SAN. PRESSURE MAIN & VALVE	——SS——●——SS——	——SS——●——SS——
SAN. SERVICE BOX	——S	——S
WATERMAIN & VALVE	——W——●——W——	——W——●——W——
WATER METER & SERVICE	——WM	——WM
FIRE HYDRANT	F.H.	F.H.
GAS MAIN & VALVE	——G——●——G——	——G——●——G——
BURIED UTILITIES (POWER,TELE & TV)	——BU——	——BU——
POWER POLE	◆	◇
CONCRETE CURB	———	- - - - -
CONCRETE SIDEWALK	———	- - - - -
BENCH MARK	⊛	⊜



VICINITY MAP

NO SCALE

DIRECTOR OF PUBLIC WORKS

DOUGLAS QUINN, P.E.

EXHIBIT "J"

REVISIONS	REVISIONS

Designed Under The Supervision Of RICHARD J. SPOSITO Registered Civil Engineer No. 13935

Mac Kay & Sposito
ENGINEERS SURVEYORS PLANNERS
110 E. 17TH STREET VANCOUVER, WA. 98663
(206) 695-3411 (503) 289-6726

Date: March 1992
Scale: AS SHOWN
Designed By: TJ
Drawn By: TJ
Checked By: D.J.N. & R.S.

W & S DWG FILE: 10990PL1

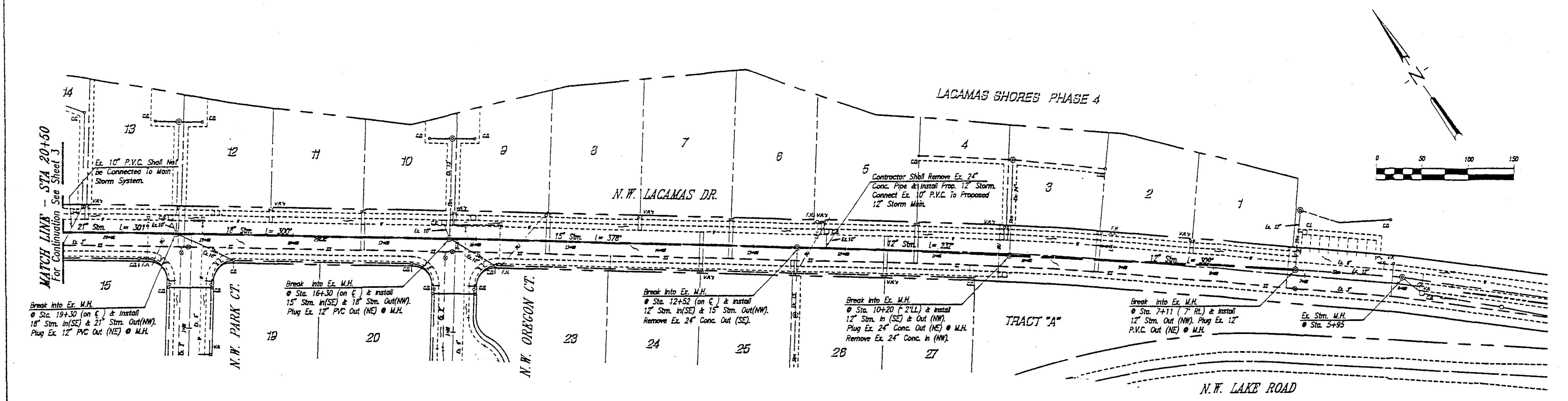
IMPROVEMENT PLANS

MODIFICATIONS TO LACAMAS SHORES STORMWATER DISPOSAL SYSTEM

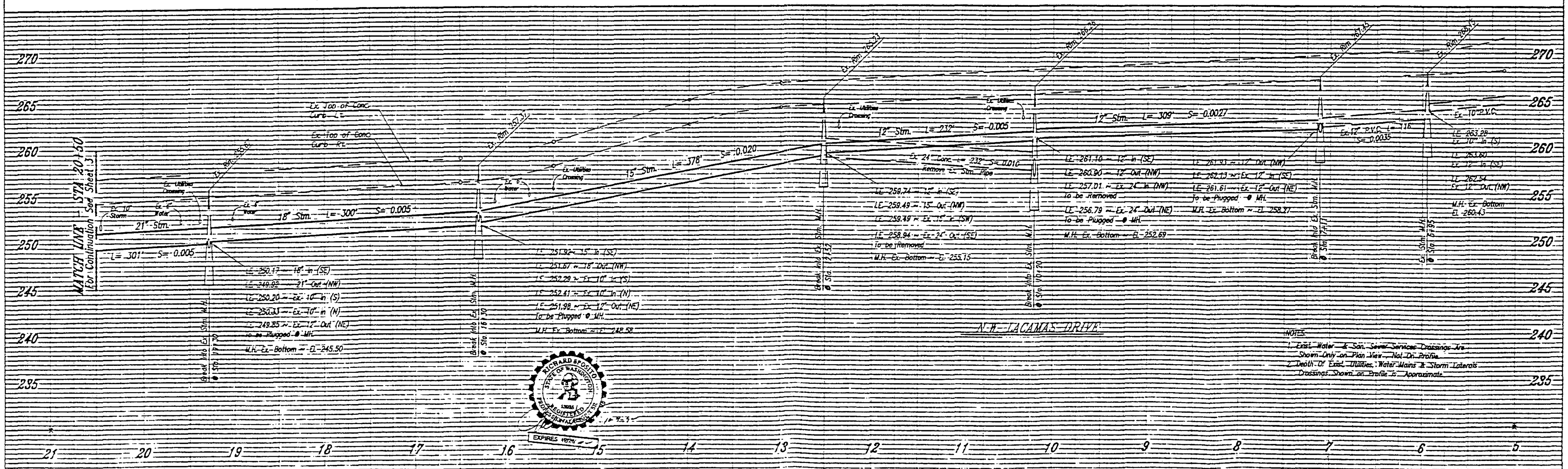
CITY OF CAMAS WASHINGTON

Job Number 10,990X

Sheet 1 OF 5


LACAMAS SHORES PHASE 4
N
0 50 100 150
MATCH LINE - STA 20+50
For Continuation See Sheet 3
Ex. 10" P.V.C. Shall Not be Connected To Main Storm System.
N.W. LACAMAS DR.
Contractor Shall Remove Ex. 24" Conc. Pipe & Install Prop. 12" Storm. Connect Ex. 10" P.V.C. To Proposed 12" Storm Main.
21" Stm. L= 301'
18" Stm. L= 300'
15" Stm. L= 378'
12" Stm. L= 232'
12" Stm. L= 309'
Break Into Ex. M.H. @ Sta. 19+30 (on ℄) & Install 18" Stm. In(SE) & 21" Stm. Out(NW). Plug Ex. 12" PVC Out (NE) @ M.H.
Break Into Ex. M.H. @ Sta. 16+30 (on ℄) & Install 15" Stm. In(SE) & 18" Stm. Out(NW). Plug Ex. 12" PVC Out (NE) @ M.H.
Break Into Ex. M.H. @ Sta. 12+52 (on ℄) & Install 12" Stm. In(SE) & 15" Stm. Out(NW). Remove Ex. 24" Conc. Out (SE).
Break Into Ex. M.H. @ Sta. 10+20 (2'LL) & Install 12" Stm. In (SE) & Out (NW). Plug Ex. 24" Conc. Out (NE) @ M.H. Remove Ex. 24" Conc. In (NW).
Break Into Ex. M.H. @ Sta. 7+11 (7' Rt.) & Install 12" Stm. Out (NW). Plug Ex. 12" P.V.C. Out (NE) @ M.H.
Ex. Stm. M.H. @ Sta. 5+95
N.W. PARK CT.
N.W. OREGON CT.
TRACT "A"
N.W. LAKE ROAD
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 19 20 23 24 25 26 27

STORM SEWER INTERCEPTOR


270
265
260
255
250
245
240
235
MATCH LINE - STA 20+50
For Continuation See Sheet 3
Ex. Top of Conc. Curb Lt.
Ex. Top of Conc. Curb Rt.
21" Stm. L= 301' S= 0.005
18" Stm. L= 300' S= 0.005
15" Stm. L= 378' S= 0.020
12" Stm. L= 232' S= 0.005
12" Stm. L= 309' S= 0.0027
Ex. 12" P.V.C. L= 116 S= 0.0035
Ex. 24" Conc. L= 232' S= 0.010 Remove Ex. Stm. Pipe
Ex. 10" P.V.C.
Ex. Utilities Crossing
I.E. 250.17 ~ 18" In (SE)
I.E. 249.92 ~ 21" Out (NW)
I.E. 250.20 ~ Ex. 10" In (S)
I.E. 250.33 ~ Ex. 10" In (N)
I.E. 249.85 ~ Ex. 12" Out (NE) to be Plugged @ M.H.
M.H. Ex. Bottom ~ El. 245.50
I.E. 251.92 ~ 15" In (SE)
I.E. 251.67 ~ 18" Out (NW)
I.E. 252.29 ~ Ex. 10" In (S)
I.E. 252.41 ~ Ex. 10" In (N)
I.E. 251.98 ~ Ex. 12" Out (NE) to be Plugged @ M.H.
M.H. Ex. Bottom ~ El. 248.58
I.E. 258.74 ~ 12" In (SE)
I.E. 259.49 ~ 15" Out (NW)
I.E. 259.49 ~ Ex. 15" In (SW)
I.E. 258.94 ~ Ex. 24" Out (SE) to be Removed
M.H. Ex. Bottom ~ El. 255.15
I.E. 261.10 ~ 12" In (SE)
I.E. 260.90 ~ 12" Out (NW)
I.E. 257.01 ~ Ex. 24" In (NW) to be Removed
I.E. 256.79 ~ Ex. 24" Out (NE) to be Plugged @ M.H.
M.H. Ex. Bottom ~ El. 252.69
I.E. 261.93 ~ 12" Out (NW)
I.E. 262.13 ~ Ex. 12" In (SE)
I.E. 261.61 ~ Ex. 12" Out (NE) to be Plugged @ M.H.
M.H. Ex. Bottom ~ El. 258.37
I.E. 263.28 Ex. 10" In (S)
I.E. 263.60 Ex. 12" In (SE)
I.E. 262.54 Ex. 12" Out (NW)
M.H. Ex. Bottom El. 260.45
Break Into Ex. Stm. M.H. @ Sta. 19+30
Break Into Ex. Stm. M.H. @ Sta. 16+30
Break Into Ex. Stm. M.H. @ Sta. 12+52
Break Into Ex. Stm. M.H. @ Sta. 10+20
Break Into Ex. Stm. M.H. @ Sta. 7+11
Ex. Stm. M.H. @ Sta. 5+95
Ex. Rim 255.67
Ex. Rim 257.51
Ex. Rim 265.23
Ex. Rim 266.70
Ex. Rim 267.45
Ex. Rim [illegible]
N.W. LACAMAS DRIVE
NOTES:
1. Exist. Water & San. Sewer Services Crossings Are Shown Only on Plan View. Not On Profile.
2. Depth Of Exist. Utilities, Water Mains & Storm Laterals Crossings Shown on Profile Is Approximate.
RICHARD SPOSITO
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER
EXPIRES
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5

M & S FILE NO: 10990PL2.DWG

REVISIONS	REVISIONS

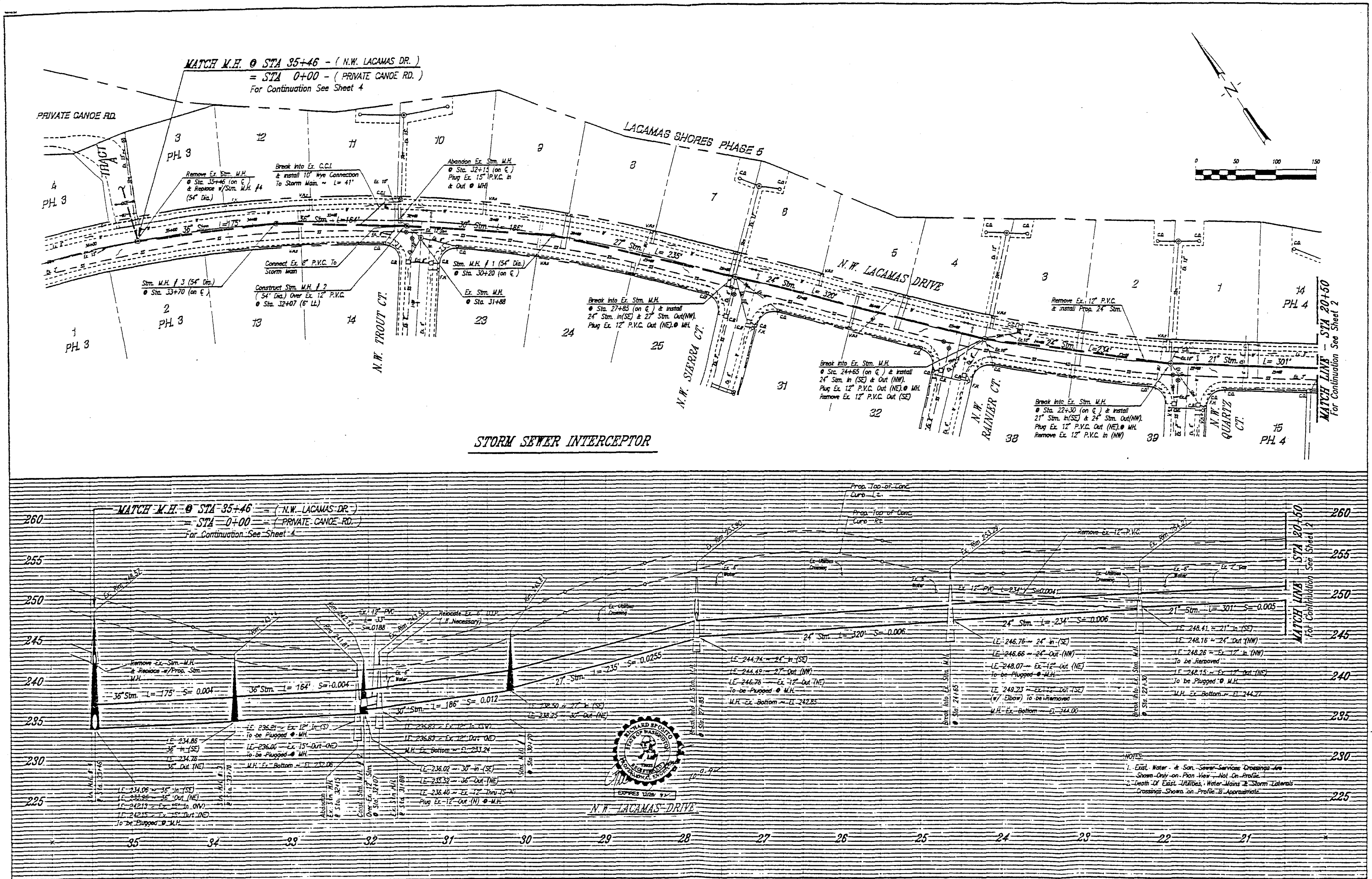
Designed Under The Supervision Of
____
RICHARD SPOSITO
Registered Civil Engineer No. 13,935

Mac Kay & Sposito
ENGINEERS SURVEYORS PLANNERS
110 E. 17TH STREET VANCOUVER, WA. 98663
(206) 695-3411 (503) 285-6725

Date: March 1992
Scale: Horiz. 1"=50' Vert. 1"=5'
Designed By: T.Z.
Drawn By: T.Z.
Checked By: D.J.M. & R.S.

IMPROVEMENT PLANS
MODIFICATIONS TO LACAMAS SHORES STORMWATER DISPOSAL SYSTEM
CITY OF CAMAS WASHINGTON

Job Number: 10,990X
Sheet: 2 OF 5


MATCH M.H. @ STA 35+46 - (N.W. LACAMAS DR.)
= STA 0+00 - (PRIVATE CANOE RD.)
For Continuation See Sheet 4
PRIVATE CANOE RD.
TRACT A
LACAMAS SHORES PHASE 5
PH. 3
PH. 4
N.W. LACAMAS DRIVE
N.W. TROUT CT.
N.W. SIERRA CT.
N.W. RAINIER CT.
N.W. QUARTZ CT.
36" Stm. L=175'
36" Stm. L=164'
30" Stm. L=186'
27" Stm. L=235'
24" Stm. L=320'
24" Stm. L=234'
21" Stm. L=301'
Remove Ex. Stm. M.H. @ Sta. 35+46 (on ℄) & Replace w/Stm. M.H. #4 (54" Dia.)
Break into Ex. C.C.I. & install 10" Wye Connection To Storm Main ~ L= 41'
Abandon Ex. Stm. M.H. @ Sta. 32+15 (on ℄) Plug Ex. 15" P.V.C. In & Out @ MH)
Connect Ex. 8" P.V.C. To Storm Main
Stm. M.H. # 1 (54" Dia.) @ Sta. 30+20 (on ℄)
Stm. M.H. # 3 (54" Dia.) @ Sta. 33+70 (on ℄)
Construct Stm. M.H. # 2 (54" Dia.) Over Ex. 12" P.V.C. @ Sta. 32+07 (6' Lt.)
Ex. Stm. M.H. @ Sta. 31+88
Break into Ex. Stm. M.H. @ Sta. 27+85 (on ℄) & install 24" Stm. in(SE) & 27" Stm. Out(NW). Plug Ex. 12" P.V.C. Out (NE).@ MH.
Break into Ex. Stm. M.H. @ Sta. 24+65 (on ℄) & install 24" Stm. in (SE) & Out (NW). Plug Ex. 12" P.V.C. Out (NE).@ MH. Remove Ex. 12" P.V.C. Out (SE)
Remove Ex. 12" P.V.C. & install Prop. 24" Stm.
Break into Ex. Stm. M.H. @ Sta. 22+30 (on ℄) & install 21" Stm. In(SE) & 24" Stm. Out(NW). Plug Ex. 12" P.V.C. Out (NE).@ MH. Remove Ex. 12" P.V.C. In (NW)
MATCH LINE - STA 20+50
For Continuation See Sheet 2
STORM SEWER INTERCEPTOR
N.W. LACAMAS DRIVE
36" Stm. L=175' S= 0.004
36" Stm. L= 164' S=0.004
30" Stm. L= 186' S= 0.012
27" Stm. L= 235' S= 0.0255
24" Stm. L= 320' S= 0.006
24" Stm. L= 234' S= 0.006
21" Stm. L= 301' S= 0.005
Remove Ex. Stm. M.H. & Replace w/Prop. Stm. M.H.
Relocate Ex. 6" D.I.P. (If Necessary)
Remove Ex. 12" P.V.C.
Prop. Top of Conc. Curb Lt.
Prop. Top of Conc. Curb Rt.
NOTES:
1. Exist. Water - & San. Sewer Services Crossings Are Shown Only on Plan View , Not On Profile.
2. Depth Of Exist. Utilities, Water Mains & Storm Laterals Crossings Shown on Profile Is Approximate.
RICHARD SPOSITO
STATE OF WASHINGTON
EXPIRES 12/26/92
260
255
250
245
240
235
230
225
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
0
50
100
150
N

M & S FILE NO: 10990PL3.DWG

REVISIONS	REVISIONS

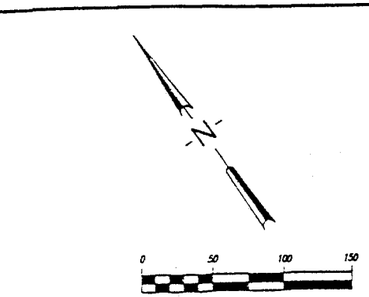
Designed Under The Supervision Of
RICHARD J. SPOSITO
Registered Civil Engineer No. 13,935

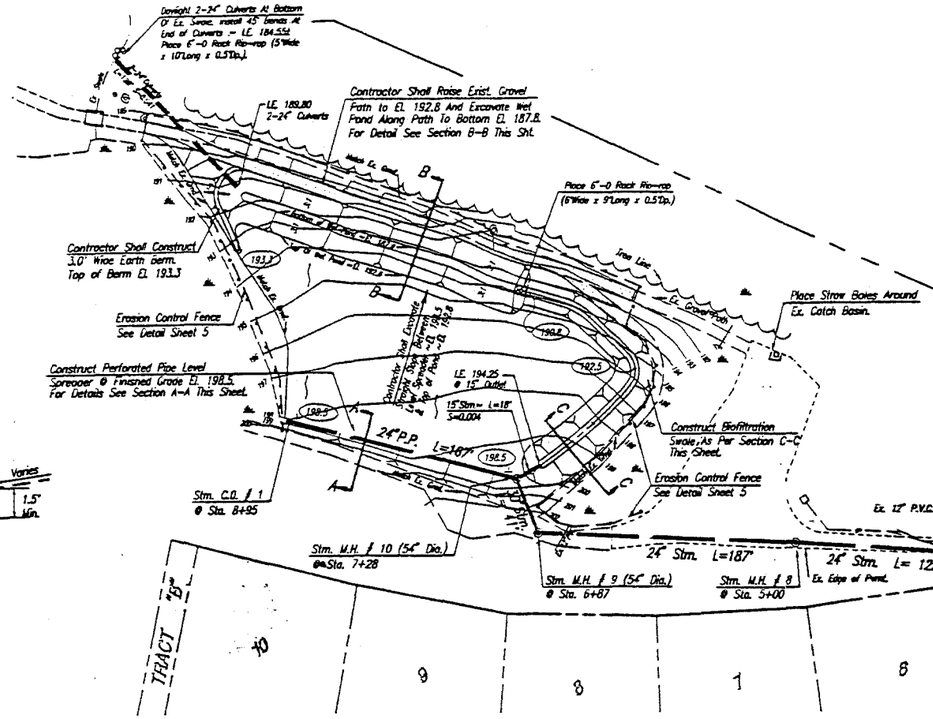
Mac Kay & Sposito
ENGINEERS SURVEYORS PLANNERS
110 E. 17TH STREET VANCOUVER, WA. 98663
(206) 695-3411 (503) 285-6726

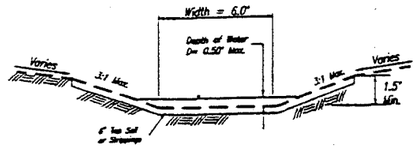
Date: March 1992
Scale: Horiz. 1"=50' Vert. 1"=5'
Drawn By: D.J.W. & R.S.

IMPROVEMENT PLANS
MODIFICATIONS TO LACAMAS SHORES STORMWATER DISPOSAL SYSTEM
CITY OF CAMAS WASHINGTON

Job Number 10,990X
Sheet 3 OF 5

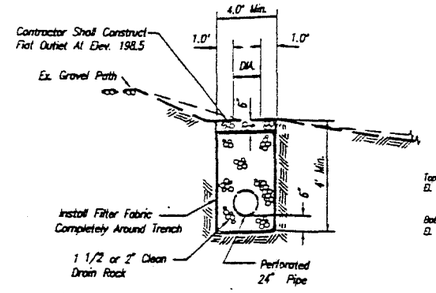




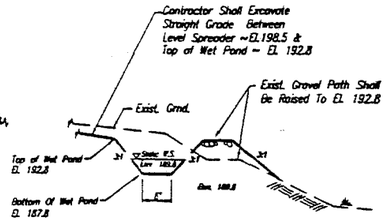


Flow= 4.0 cfs Length= 200' Slope= 0.017

SECTION C-C
BIOFILTRATION SWALE
NO SCALE



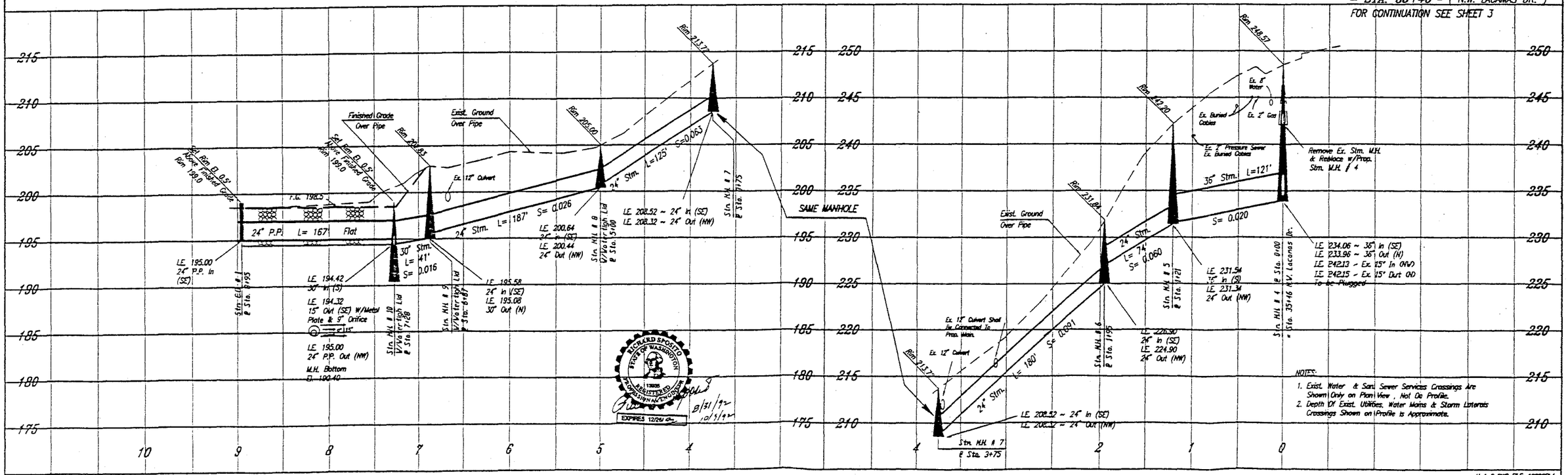
SECTION A-A
PERFORATED PIPE LEVEL SPREADER
NO SCALE



SECTION B-B
RAISED PATH & WET POND
NO SCALE

MATCH M.H. @ STA. 0+00 - (PRIVATE CANOE RD.)
= STA. 35+46 - (N.W. LACAMAS DR.)

FOR CONTINUATION SEE SHEET 3



STORM SEWER INTERCEPTOR

NOTES:
1. Exist. Water & Sani. Sewer Services Crossings Are Shown Only on Plan View, Not On Profile.
2. Depth Of Exist. Utilities, Water Mains & Storm Laterals Crossings Shown on Profile is Approximate.

M & S DWG FILE: 10990P4

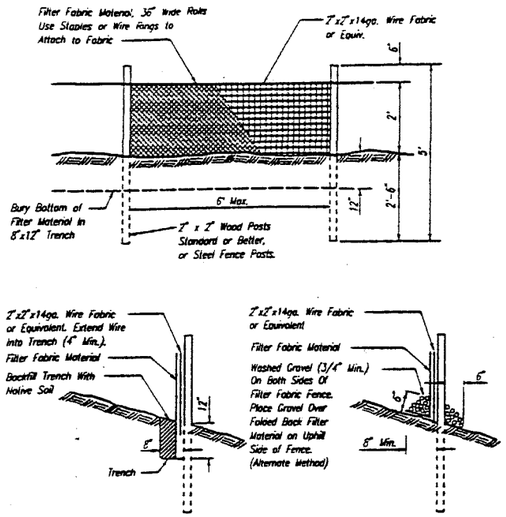
REVISIONS	REVISIONS

M&S Mac Kay & Sposito
ENGINEERS SURVEYORS PLANNERS
1703 MAIN STREET (206) 695-3411
VANCOUVER, WA. 98660 (503) 289-6726

Date AUGUST 1992
Scale HORIZ. 1"=50' VERT. 1"=5'
Designed By TZ
Drawn By TZ
Checked By D.J.M. & R.S.

IMPROVEMENT PLANS
MODIFICATIONS TO LACAMAS SHORES STORMWATER DISPOSAL SYSTEM
CITY OF CAMAS WASHINGTON

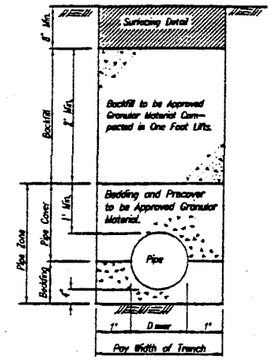
Job Number 10,990X
Sheet 4 OF 5



NOTE: Prefabricated Filter Fabric Fence Material (Extra Strength Filter Fabric) May Be Used With Prior Approval of the Engineer. 2"x2" x14 ga. Wire Fabric May Be Deleted If This Material is Used.

TEMPORARY EROSION CONTROL FENCE

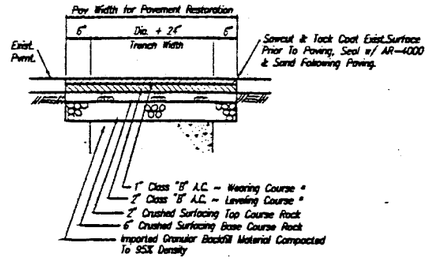
NO SCALE



CLASS A

BEDDING & BACKFILL DETAIL

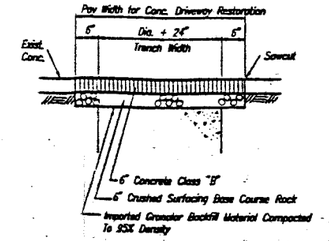
NO SCALE



PAVEMENT RESTORATION DETAIL

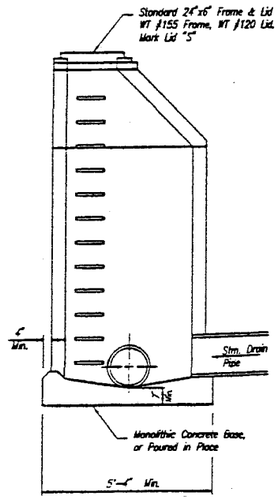
NO SCALE

* Note: For Private Canoe Road Pavement Restoration Use Total of 2" Class "B" Asphalt Concrete Course.



CONC. DRIVEWAY RESTORATION DETAIL

NO SCALE



STANDARD MANHOLE

NO SCALE

11/9/89

REVISIONS	REVISIONS

M & S

Mac Kay & Sposito

ENGINEERS SURVEYORS PLANNERS
1703 MAIN STREET VANCOUVER, WA. 98660
(206) 695-3411 (503) 289-6726

Date	AUGUST, 1992
Scale	AS SHOWN
Designed By	TZ
Drawn By	TZ
Checked By	D.J.M. & R.S.

M & S DWG FILE: 10990PL5

DETAILS SHEET

MODIFICATIONS TO LACAMAS SHORES STORMWATER DISPOSAL SYSTEM

CITY OF CAMAS WASHINGTON

Job Number 10,990X

Sheet 5 OF 5

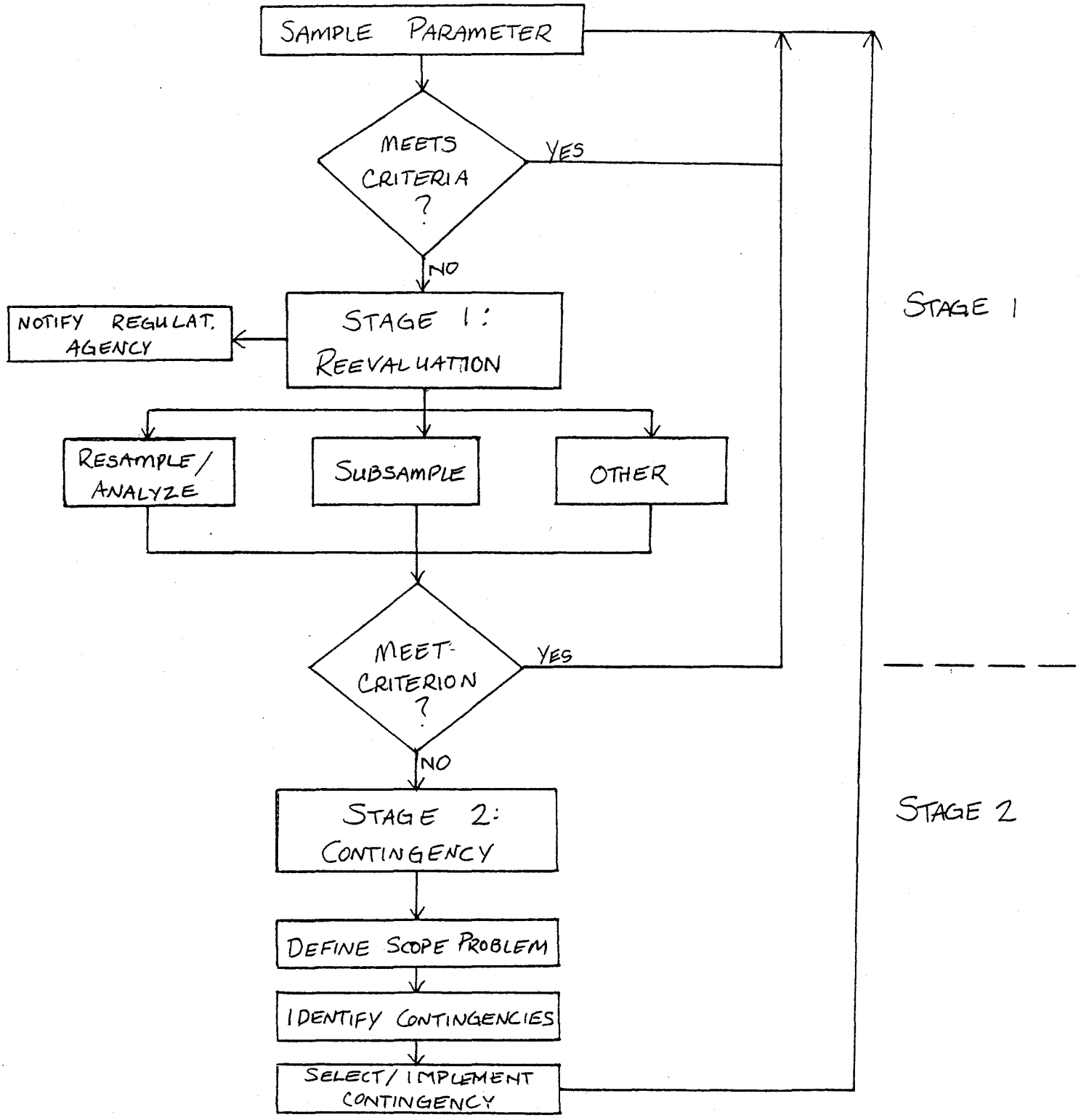


Figure 26. Diagram of monitoring information flow in two-stage regulatory process. At stage 1 there is a routine reevaluation of the data. In stage 2 monitoring has indicated that remedial action must be implemented.

EXHIBIT "K"

SECTION VII

CHRONOLOGICAL CORRESPONDENCE

(Complete correspondence file included in Parties of Records packets only)

LACAMAS SHORES PERMIT REVISION
List of Chronological Correspondence

- MILLER, NASH, WIENER, HAGER & CARLSEN
  April 9, 1993
  - Application for revisions to Shoreline Substantial Development Conditional Use Permits.

- MILLER, NASH, WIENER, HAGER & CARLSEN
  March 12, 1993
  - Vanport Mfg. agreement to additional conditions to its January 15, 1993, application for revisions to Shoreline Substantial Development and Conditional Use Permits.

- CITY OF CAMAS
  February 10, 1993
  - Response to real estate agent's questions

- DALE COGLENESE
  February 8, 1993
  - Questions about maintenance of storm drainage utility system, review of deeds, encroachment on city property, setback requirements, survey related to conservancy zone, and extension of developer's responsibility relating to the storm utility system. (Refers to 11/13/91 and 1/30/92 letters from City of Camas.)

- MILLER, NASH, WIENER, HAGER & CARLSEN
  January 15, 1993
  - Request for issuance of revised Shoreline Substantial Development and Conditional Use permits. (Refers to 8/18/92 letter from Attorney General's Office; 10/26/92 letter from Miller, Nash, Weiner, Hager & Carlsen regarding view shed plan dated 10/20/92; and MacKay and Sposito construction plans.)

- JOHN S. KARPINSKI
  December 11, 1992
  - Response to Vanport's settlement offer.

- CITY OF CAMAS
  December 1, 1992
  - Comments regarding settlement agreement and general release.

- CITY OF CAMAS
  December 1, 1992
  - Comments regarding proposed view shed plan.

- ATTORNEY GENERAL OF WASHINGTON
  November 2, 1992
  - Acknowledgement of receipt of letter responding to Allen Miller's August 18 proposals.

- MILLER, NASH, WIENER, HAGER & CARLSEN
  October 27, 1992
  - Cover sheet for copies of correspondence with DOE in response to the Attorney General's proposed resolution of dispute. Copies include:

    - MILLER, NASH, WIENER, HAGER & CARLSEN
      October 26, 1992
      - Review of proposals set forth in Attorney General's August 18 letter.
      - Copy of "Settlement Agreement and General Release"

    - J.D. WALSH & ASSOCIATES, INC.
      October 20, 1992
      - Viewshed Plan

- ATTORNEY GENERAL OF WASHINGTON
  August 18, 1992
  - Response to letter of July 9, 1992, which followed the site visit at Lacamas Lake on June 30th which sets forth DOE's conditions for accepting the proposed revision.

- J.D. WHITE
  July 15, 1992
  - Determination on presence of uplands within an area proposed for dedication.

- CITY OF CAMAS
  July 14, 1992
  - Review of type of land offered the City to make up the conservancy zone shortage.

- MILLER, NASH, WIENER, HAGER & CARLSEN
  July 9, 1992
  - Letter more formally conveying the proposals addressed at a meeting the previous Tuesday which included Vanport Manufacturing, DOE and the Attorney General.

- MACKAY & SPOSITO
  April 14, 1992
  - Lacamas Shores - stormwater contingency plan.

- DEPARTMENT OF ECOLOGY
  March 20, 1992
  - Clarification about policy regarding removal of vegetation within the conservancy zone.

- CITY OF CAMAS
  March 19, 1992
  - Request for interpretation on vegetation removal in conservancy zone.

- CITY OF CAMAS
  March 13, 1992
  - Comments to Engineer on the proposed modifications to Lacamas Shores stormwater disposal system.

- MACKAY & SPOSITO
  March 12, 1992
  - Map showing the Conservancy Zone overlap.

- CITY OF CAMAS
  March 6, 1992
  - Request for legal opinion on the removal of vegetation on private property in conservancy zone.

- SHAFIUZZAMAN, LISKE, CHO, HOPKINS, BOWEN, KELJO, COLLINS, WAKEFIELD, STANLEY AND MIKKOLA (LAKESIDE PROPERTY OWNERS)
  February 28, 1992
  - Desire to not alter property lines and to maintain the right to remove vegetation to preserve views.

- DEPARTMENT OF ECOLOGY
  February 8, 1992
  - Summary of items discussed and DOE's preliminary response to discussion on February 5, 1992, including alternative stormwater treatment, permit violations and additional issues.

- CITY OF CAMAS
  February 6, 1992
  - Summary of meeting with DOE, Vanport, City of Camas and IRC to discuss the relocation of a bubbler and allegations of violations from DOE.

- DEPARTMENT OF ECOLOGY
  February 4, 1992
  - Outline of permit successes, the need to redesign the stormwater system for the southern part of the project and resolution of current permit violations.

- CITY OF CAMAS
  January 30, 1992
  - Clarification of ultimate ownership of the storm water disposal system within the Lacamas Shores development.

- VANPORT MANUFACTURING
  January 1992
  - Lacamas Shores Storm Drainage System Synopsis

- CITY OF CAMAS
  November 27, 1991
  - Documentation of meeting regarding discussion of violations of drainage within the conservancy zone.

- CITY OF CAMAS
  November 7, 1991
  - Site visitation regarding erosion control in Lacamas Shores.

- CITY OF CAMAS
  November 5, 1991
  - Memo about site visitation regarding erosion control problem.

- GREGORY MADEWELL
  November 5, 1991
  - Notification of red mud flowing from Lacamas View and Lake Heights developments through Lacamas Shores into the lake.

- MACKAY & SPOSITO
  April 2, 1991
  - Proposal for relocation of outflow locations. **Note on top of letter indicates that this revision not implemented/dropped/no action taken - DQ 5/20/91.**

- CITY OF CAMAS
  January 31, 1990
  - Deed of Dedication - Grantor, Vanport Mfg., conveys to the City of Camas a one hundred foot wide conservancy zone along the shoreline of the Lacamas Shores development - third 1/3.

- CITY OF CAMAS
  January 20, 1989
  - Deed of Dedication - Grantor, Vanport Mfg., conveys to the City of Camas a one hundred foot wide conservancy zone along the shoreline of the Lacamas Shores development - second 1/3.

- CITY OF CAMAS
  December 22, 1988
  - Deed of Dedication - Grantor, Vanport Mfg., conveys to the City of Camas a one hundred foot wide conservancy zone along the shoreline of the Lacamas Shores development - first 1/3.

- CITY OF CAMAS
  June 13, 1988
  - Report of Camas Council action on Shoreline Permit application. Unanimously approved with 14 conditions. Includes copy of approved Shoreline Substantial Development Permit and Conditional Use Permit.

- CITY OF CAMAS
  October 24, 1977
  - Shoreline Management Master Program, as it pertains to conservancy environment.

- CITY OF CAMAS

  - Map showing the approved location of the bubblers on the Lake's bluff.

- CITY OF CAMAS

  - Phase 4, Lacamas Shores, construction drawings which show location of bubblers.

- CITY OF CAMAS

  - Phase 5, Lacamas Shores, construction drawings which show location of bubblers.

SECTION VIII

MISCELLANEOUS PHOTOS OF SITE

Phase 4 Lot 1, 2, 3, & 4

Phase 5

℄ 12 ↗ Lot 11 & 12 ℄ 11 ↗

Phase 5

Phase 5 Lot 11, & 12

Lot 3, Phase 3

Lot 12 Phase 5

Phase 5