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STORM WATER CONTROL PLAN

SUBDIVISION 8938 - NOVE PROPERTY

(APN# 408-170-072 & 408-180-010)
Contra Costa County, California

Prepared for:

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I. Project Setting

A. Project Description

The proposed project will occupy the 30 acre Nove property, located at the southeast corner of Richmond Parkway and Pittsburg Avenue, in the unincorporated area of City of Richmond, Contra Costa County.

The existing parcel is zoned industrial. The proposed zoning is Planned Unit Development (PUD), consisting of 374 residential units.

The Developer is proposing to develop the project site into a 374-unit residential townhome, single family and condo development. The townhome development will occupy the westerly portion of the site. The single family development will occupy the central portion of the site. The condo development will occupy the easterly portion of the site. Primary access to the site will be from Pittsburg Avenue.

Open space, Lot A, approximately 1.2 acres, is proposed along the southerly portion of the site, and a central park, Lot B, approximately 1.1 acres, is proposed at the center of the site. A 40-foot wide landscape buffer area (Lots C, D, & E), approximately .07 acres, is provided along Pittsburg Avenue. In addition, there are 2 tot lot areas (Lots I & N), approximately 0.2 acres, located along the westerly portion of the site in the townhome area.

B. Existing Site Condition

The site is roughly the shape of a trapezoid. It is bordered by Richmond Parkway to the west, Pittsburg Avenue to the north, and Wildcat Creek to the south. An existing industrial complex (West County Resource Recovery) is located east of the project site.

The existing site has been used as a nursery for many years, and is still operating as a nursery. Topography is in general relatively flat with a gentle slope from east to west. Existing site drainage is overland and drains to an existing ditch along the westerly boundary, which discharges to the existing storm drains in Pittsburg Avenue.

There is an existing 48" storm drain in Pittsburg Avenue that drains in a westerly direction crossing Richmond Parkway and eventually into the Bay.

C. Constraints and Opportunities for Storm Water Control

Due to the nature of this high density type development, existing clayey native soils and high groundwater table, the use of post construction Best Management Practices are being utilized to the extent possible. The site design has many constraints but is maximizing opportunities to utilize landscape/open space and park areas to minimize the effect of impervious areas.

The most serious constraints are the existing clayey soils, hydrologic group C/D. This site will incorporate a vast majority of import material as fill, raising the finish grade. By importing fill and creating additional depth to the seasonal groundwater table, infiltration and treatment of BMP's will be more effective. Fill will vary in depth from 3.5-feet on the south sections of the site to a depth of 1-foot to the north.

The storm water control plan is intended to deliver as much possible surface flow to grassy swales, and self-retaining areas prior to entering the conveyance system. This approach will provide the site with a runoff measure of "maximum extent practicable." By implementing this design approach through landscape features that utilize the site gravity, the general runoff will be to the north. No runoff conveyance systems will be directly emptied to Wildcat Creek, however, the open space along Wildcat creek (Lot A) and the Central Park (Lot B) will be utilized for runoff flow to grassy swales prior to entering the storm drain system. All site drainage systems will go to the existing 48" diameter storm drain located in Pittsburg Avenue.

The majority of the site impervious area is roof area that will generate quick runoff. A portion of the roof drains in the condo area are intended to be directed to splash blocks and taken to landscaped areas. Storm water planters and vegetated infiltration planter will provide filtration and increased time of concentration. These areas will be self retaining under the design storm projected flows. By positive grading to catch basins, the larger storm events will be accommodated. All areas with BMP's will drain within seventy-two hours, reducing vector concerns. Refuse areas as shown are located only for the use of the condominium units, buildings one through ten. All other residences will have curb side trash and recycling pick-up. The driveway courts are proposed as pervious pavers and will alleviate polluted storm water flows. Some of the streets will incorporate the use of grassy swales and bio-retention in the playfields and tot lots.

II. Measures to Limit Imperviousness

The following site layout characteristics are incorporated to reduce imperviousness:

1. The site is densely developed infill site, which maximizes use of streets and roads.
2. The number of parking spaces is at the minimum allowed by the County to minimize paved areas.
3. The residential area includes maximum open space possible for landscaping and recreation.
4. Open space parcels are provided throughout the site for tot lots or landscaping.
5. Pervious pavers are used in the courts in single family lots.
6. Where possible, disconnected downspouts positively draining from splash block to landscaped areas.

III. Selection and Primary Design of Storm Water Treatment BMPS

Impervious areas on the site, including all roofs, parking areas, and driveways have been divided into distinct drainage areas as shown on the Storm Water Control Plan. Runoff from each of these areas are managed by routing storm water to grassy swales to treat runoff from these areas.

Grassy swales are located in the open space lots and paseo areas between the townhome. All of the grassy swales feature a minimum 12" depth of sandy loam material (minimum infiltration rate specified to be 5 inches per hour. The grassy swales are under drained with 4" perforated PVC pipes and the underdrains are connected to underground storm mains which carry the treated runoff offsite. All drainage into and away from the grassy swales is

by gravity flow, eliminating the need to collect and pump storm water and avoiding need for vaults. The detail of these grassy swales are shown on the Storm Water Control Plan.

Self-retaining pervious areas are located in the landscape area within the condo developments. A portion of the roof drains will be discharged and flowed across the landscape areas.

Specific drainage areas and swales are shown on Tables 1 and 2 on the following pages which show the pervious and impervious area calculations:

Contra Costa Clean Water Program

Treatment BMP Sizing Worksheet

See *Stormwater C.3 Guidebook* Chapter 5 for Instructions

Project Name:	Nove Property	Date:	8/24/2005	Version 23 March 2005.	
Address/Location:	Pittsburg Ave, Richmond	APN:			
Total Project Area (in sq. ft.; exclude areas of site to remain undeveloped):	1,272,000	Impervious:	828,630	Pervious:	443,370
			65.1%		34.9%

Table 1. Pervious Areas

Area ID	Surface	Self-retaining Area (sq. ft.)	Non-self retaining Area (sq. ft.)	"C" Factor	Size * C
Lot A	Landscape	53,000		0.1	0
Lot B	Landscape	33,600		0.1	0
Lot C	Landscape	11,200		0.1	0
Lot D	Landscape	8,600		0.1	0
Lot E	Landscape	9,050		0.1	0
Court J thru W	Pavers	23,800		0.6	
					0
Totals		139,250	0		0

Runoff factors for non-self-retaining pervious areas

Surface	"C"
Turf	0.1
Landscape	0.1
Crushed aggregate	0.1
Pervious Concrete	0.6
Pervious Asphalt	0.55

Table 2. Impervious Areas Draining to Grassy Swales, and Self Retaining Areas

Area ID	Surface	Impervious Area (square feet)	Type and ID# of BMP to be used	Area Served by BMP (SF)	Sizing Factor (=0.04)	Minimum Surface Area	Surface Area as designed
A-1	Roof	2,200	Swale VS-1	2,200	0.04	88	720
A-2	Asphalt/Roof	9,670	Swale VS-2	9,670	0.04	387	1680
A-3	Roof	4,400	Swale VS-3	4,400	0.04	176	720
A-4	Asphalt/Roof	28,000	Swale VS-4	28,000	0.04	1,120	1380
A-5	Roof	4,400	Swale VS-5	4,400	0.04	176	720
A-6	Roof	2,200	Swale VS-6	2,200	0.04	88	690
A-7	Roof	4,400	Swale VS-7	4,400	0.04	176	720
A-8	Roof	2,200	Swale VS-8	2,200	0.04	88	690
A-9	Asphalt/Roof	10,800	Swale VS-9	10,800	0.04	432	1200
A-10	Asphalt/Roof	26,400	Swale VS-10	26,400	0.04	1,056	1260
A-11	Roof	4,400	Swale VS-11	4,400	0.04	176	720
A-12	Roof	2,200	Swale VS-12	2,200	0.04	88	690
A-13	Asphalt/Roof	23,000	Swale VS-13	23,000	0.04	920	1260
A-14	Roof	4,400	Swale VS-14	4,400	0.04	176	720
A-15	Roof	4,400	Swale VS-15	4,400	0.04	176	720
A-16	Asphalt/Roof	12,600	Swale VS-16	12,600	0.04	504	690
A-17	Asphalt/Roof	23,000	Swale VS-17	23,000	0.04	920	1260
A-18	Asphalt/Roof	1,800	Swale VS-18	1,800	0.04	72	1200
A-19	Roof	4,400	Swale VS-19	4,400	0.04	176	720
A-20	Asphalt/Roof	12,600	Swale VS-20	12,600	0.04	504	690
A-21	Asphalt/Roof	88,300	Swale VS-21	88,300	0.04	3,532	3600
A-22	Asphalt/Roof	69,050	Swale VS-22	69,050	0.04	2,762	3600
A-23	Asphalt/Roof	78,050	Swale VS-23	78,050	0.04	3,122	3600
A-24	Asphalt	21,900	Swale VS-24	21,900	0.04	876	1680
A-25	Asphalt	73,450	Swale VS-25	73,450	0.04	2,938	3600
A-26	Asphalt	11,000	Swale VS-26	11,000	0.04	440	1200
A-27	Asphalt/Roof	18,600	Swale VS-27	18,600	0.04	744	1200
A-28	Roof	40,300	Swale VS-28	40,300	0.04	1,612	3540
A-29	Roof	40,300	SR-29	40,300	0.04	1,612	3540
A-30	Roof	20,200	SR-30	20,200	0.04	808	2640
A-31	Asphalt/Roof	180,010	SR-31	180,010	0.04	7,200	7500
Total		828,630		828,630			

Contra Costa Clean Water Program

Treatment BMP Sizing Worksheet

See *Stormwater C.3 Guidebook* Chapter 5 for Instructions

Table 3. Impervious Areas Draining to Infiltration Basins, Infiltration Trenches, and Dry Wells

Enter Mean Annu	Percent Directly Connected Impervious Area	Amount of Area (SF)	BMP ID# and Type	Area served by BMP (SF)	Required Water Quality Volume (CF)	Proposed depth (ft.)	Porosity of fill (Rock = 35%; Basin = 100%)	Minimum required BMP Surface Area (SF)	Proposed Surface Area (SF)	Infiltration Rate (in./hr.)	Time to drain (hours)
indicated on site											
		0		0							

Total

Sizing of Conventional BMPs to Serve Entire Site:

	Table 1:	Table 2:	Table 3:	Total	Remaining impervious area	Remaining Total Area	Percent DCIA of remaining area	Required Water Quality Volume
Volume-based BMPs	139,250	828,630	0	967,880	0	304,120	0%	0

OR

			Composite "C" Factor	Design Flow Rate (cfs)
Flow-Based BMPs	0	304,120	0%	0.000

IV. SOURCE CONTROL MEASURES

To further reduce the potential for pollutants to enter runoff, the following BMPs could be implemented:

Table 3 – Sources and Source Control BMP's

Potential Source	Permanent BMPS	Operational BMPs
On-site drain inlets.	Inlets for swale overflows are relatively inaccessible, reducing the potential for dumping. Inlets that could be accessed from sidewalks and driveways will be marked with a **"No Dumping - Drains to Creek"** or similar message.	• Inlet markings will be inspected annually and replaced or renewed as needed. • Swales and related structures and features will be inspected and maintained as specified in the BMP Operation and Maintenance Plan (to be developed and submitted for approval).
Interior parking garages (in residential area).	Any floor drains in the covered parking area are to be plumbed to the sanitary sewer with grease trap designed box..	Drains will be periodically inspected to avoid blockages and overflow grease box cleaned.
Need for future indoor and structural pest control.	Standard building design minimizes potential needs for future pest control.	Buyers will receive integrated pest management information.
Landscape/outdoor pesticide use.	• Any native trees, shrubs, and ground cover on the site will be preserved to the maximum extent possible. • Landscaping will be designed to minimize required irrigation and runoff, to promote surface infiltration, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution. • Plantings for swales will be selected to be appropriate to anticipated soil and moisture conditions. • Where possible, pest-resistant plants will be selected, especially for locations adjacent to hardscape. • Plants will be selected appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	• Buyers will receive integrated pest management information. • All open space landscaping is to be maintained by a professional landscaping contractor.
Trash Enclosures	• Outside Buildings 1 thru 10 and in residential area to be roofed and bermed. Any drains must connect to sanitary sewer with grease trap box design. • Other trash disposal is to be indoors and floors sloped to prevent drainage to exterior. Any floor drains must connect to	

Potential Source	Permanent BMPS	Operational BMPs
	sanitary sewer. • All dumpsters will be marked with a "Do Not Dump Hazardous Materials Here" or similar.	
Vehicle and equipment cleaning	All paved areas drain to swales rather than directly to storm drains.	No onsite car washing will be provided.
Vehicle maintenance		Vehicle maintenance or repair on site is prohibited.
Fire sprinkler test water	Fire sprinkler test valves will be equipped with a means to divert test water to the sanitary sewer.	
Roofing Material	No roofing, gutters, and trim made of copper or unprotected metals that may leach into runoff.	
Roofing	Roof top mounted equipment to be roofed or covered to prevent pollutants from entering runoff.	
Condo Buildings	Exterior hose bibs to have automatic shutoff.	

V. Permitting and Code Compliance Issues

There are no known conflicts between the proposed storm water control plan and the County ordinances or policies. Any conflicts that are found will be resolved through the design review process or during subsequent permitting.

VI. BMP Operations and Maintenance

A. Means to Finance and Implement BMP Maintenance

All storm water treatment facilities in this plan will be maintained by the Homeowner's Association. The applicant accepts responsibility for interim operation and maintenance of the facilities until such time as this responsibility is formally transferred to a subsequent owner.

B. Summary of Maintenance Requirements

Swales remove pollutants primarily by filtering runoff slowly through an active layer of soil. Routine maintenance is needed to insure that flow is unobstructed, that erosion is prevented, and that soils are held together by plant roots and are biologically active. Typical routine maintenance consists of the following:

- Inspect inlets, exposure of soils, or other evidence of erosion. Clear any

obstructions and remove any accumulation of sediment. Examine rock or other material used as a splash pad and replenish if necessary.

- Inspect outlets for erosion or plugging.

- Inspect side slopes for evidence of instability or erosion and correct as necessary.

- Observe soil at the bottom of the swale or filter for uniform percolation throughout. If portions of the swale or filter do not drain within 48 hours after the end of the storm, the soil should be tilled and replanted. Remove any debris or accumulations of sediment.

- Confirm that check dams and flow spreaders are in place and level and that channelization within the swale of filter is effectively prevented.

- Examine the vegetation to insure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary, remove fallen leaves and debris, prune large shrubs or trees, and mow turf areas. Confirm that irrigation is adequate and not excessive. Replace dead plants and remove invasive vegetation.

- Abate any potential vectors by filling in the ground and around swale and by insuring that there are no areas where water stands longer than 48 hours following a storm. If mosquito larvae are present and persistent, contact the County Vector Control District for information and advise. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.

C. Inspection/Maintenance Responsibility for Structural Source Control and Treatment Control BMPs

Maintenance mechanism for all structural source control and treatment control BMPs:

1. Trash Enclosure drain to be inspected and cleaned every 3 months for debris.
2. All inlets to be inspected for debris twice a year, with one inspection yearly on October 1st.
3. Swales checked for plant and landscape health. Check for removable amounts of retained silt. Check for aeration of landscaped and swale soils.

D. Operation and Maintenance

1. A draft Storm Water Control Operation and Maintenance Plan should be submitted with the construction plans and a final Storm Water Control Operation and Maintenance Plan will be submitted prior to issuance of a Certificate of Occupancy.
2. A Storm Water Management Facilities Operation and Maintenance Agreement and Right of Entry (see Appendix A) should be executed.

VII. Construction Plan C.3 Checklist

Storm Water Control Plan Reference	BMP Description	Plan Sheet #
Table 1 & Storm Water Control Plan	Self-retaining Area SR-1, 2, & 3 graded to retain first inch of rainfall.	
Table 2 & Storm Water Control Plan	Grassy VS-1 to VS-28 swales sized as specified and designed to capture and route areas delineated on the Storm Water Control Plan.	
Storm Water Control Plan	Permeable pavers are installed in the courts for single family lots.	
Table 3	On-site drain inlets (if any) to be marked with "no dumping" message.	
Table 3	Preservation of any native trees, shrubs, or ground cover.	
Table 3	Plant selection to minimize irrigation, minimize use of fertilizers and pesticides, and pest resistance.	
Table 3 & Storm Water Control Plan	Trash enclosures in condo area to be bermed and roofed.	
Table 3	Trash dumpster in condo area to be marked with "No Dumping of Hazardous Materials" or similar.	
Table 3	Hose bibs on residential condo buildings to have automatic shutoff or require keys to operate.	
Table 3	Rooftop mounted equipment to be roofed or covered to prevent pollutants from entering runoff.	
Table 3	Fire sprinkler test valves to be equipped to drain test water to sanitary.	
Table 3	No roofing, gutters, and trim made of copper or unprotected metals that may leach into runoff.	

VIII. Certification

The selection, sizing, and preliminary design of treatment BMP's and other control measures in the plan meet the requirements of Regional Water Quality Control Board Order R2-2003-0022.