Appendix IV-C –
Recommendations for Management of Street Wastes

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Introduction

This appendix is a summary, taken from the June 1999 draft Ecology publication titled Recommendations for Management of Street Waste (publication WQ 99-09). The guidance document addresses waste generated from stormwater maintenance activities such as street sweeping and the cleaning of catch basins and, to a limited extent, other stormwater conveyance and treatment facilities. Limited information is available on the characteristics of wastes from detention/retention ponds, bioswales, and similar stormwater treatment facilities. The recommendations provided here may be generally applicable to these facilities, with extra diligence given to waste characterization.

These recommendations do not constitute rules or regulations, but are suggestions for street waste handling, reuse, and disposal using current regulations and the present state of knowledge of street waste constituents. The recommendations are intended to address the liquid and solid wastes collected during routine maintenance of stormwater catch basins, detention/retention ponds and ditches and similar stormwater treatment and conveyance structures, and street and parking lot sweeping. In addition to these recommendations, end users and other authorities may have their own requirements for street waste reuse and handling.

"Street Wastes" include liquid and solid wastes collected during maintenance of stormwater catch basins and detention/retention ponds and ditches and similar stormwater treatment and conveyance structures, and solid wastes collected during street and parking lot sweeping.

"Street Wastes," as defined here, does not include solids and liquids from street washing using detergents, cleaning of electrical vaults, vehicle wash sediment traps, restaurant grease traps, industrial process waste, sanitary sewage, mixed process, or combined sewage/stormwater wastes. Wastes from oil/water separators at sites that load fuel are not included as street waste. Street waste also does not include flood debris, land slide debris, and chip seal gravel.

Street waste does not ordinarily classify as dangerous waste. The owner of the stormwater facility and/or collector of street waste is considered the waste generator and is responsible for determining whether or not the waste designates as dangerous waste. Sampling to date has shown that material from routine maintenance of streets and stormwater facilities does not classify as dangerous waste (see Table C.6 below). However, it is possible that street waste from spill sites could classify as

dangerous waste. Street waste from areas with exceptionally high average daily traffic counts may contain contaminants – such as heavy metals, total petroleum hydrocarbons (TPH), and carcinogenic polycyclic aromatic hydrocarbons(c-PAH) – at levels that limit reuse options.

Street Waste Solids

Street waste is solid waste. While street waste from normal street and highway maintenance is not dangerous waste, it is solid waste, as defined under The Solid Waste Management Act (Chapter 70.95 RCW) and under Solid Waste Handling Standards (Chapter 173-350 WAC). Under the Solid Waste Management Act, local health departments have primary jurisdiction over solid waste management. Street waste solids may contain contaminants at levels too high to allow unrestricted reuse. There are currently no specific references in the Solid Waste Handling Standards to facilities managing street waste solids. These facilities will typically fit under the section dealing with Piles Used for Storage and Treatment (Section 320 of the regulation). There are no specific references for reuse and disposal options for street wastes in the Solid Waste Handling Standards, although the Solid Waste Handling Standards do not apply to clean soils. In the rule, clean soils are defined as 'soils that do not contain contaminants at concentrations which could degrade the quality of air, waters of the state, soils, or sediments; or pose a threat to the health of humans or other living organisms' (WAC 173-350-100). Whether or not a soil is a clean soil depends primarily upon the level of contaminants and, to a lesser degree, on the background level of contaminants at a particular location and the exposure potential to humans or other living organisms. Therefore, both the soil and potential land application sites must be evaluated to determine if a soil is a clean soil. The Tacoma-Pierce County Health Department should be contacted to determine if a street waste meets the definition of "clean soil" when it will be reused as a soil.

There is no simple regulatory mechanism available to classify street waste solids as "clean" for uncontrolled reuse or disposal. Local health districts have historically used the Model Toxics Control Act (MTCA) Cleanup Regulation Method A residential soil cleanup levels to approximate "clean" and to make decisions on land application proposals. These regulations were amended in February 2001. The MTCA regulation is not intended to be directly applied to setting contaminant concentration levels for land application proposals. However, they may provide human health and environmental threat information and a useful framework for such decisions, when used in conjunction with other health and environmental considerations. The Tacoma-Pierce County Health Department should be contacted to determine local requirements for making this determination.

Using the old MTCA regulations, many local health departments have set a criteria of 200 mg/Kg Total Petroleum Hydrocarbons (TPH) for diesel and heavy fuel oils as a threshold level for clean soil. Using the new

MTCA terrestrial ecological evaluation procedures, allowable TPH levels for land application could range from 200 to 460, depending on site characteristics and intended land use. Street waste sampling has historically yielded TPH values higher than 200 mg/kg for hydrocarbons in the diesel and heavy oil range. These values typically reflect interference from natural organic material and, to a lesser extent, relatively immobile petroleum hydrocarbons. The mobile hydrocarbons that are of concern for groundwater protection are generally not retained with street waste solids. Ecology's Manchester Lab has developed an analytical method to reduce the problem of natural organic material being included in the TPH analysis for diesel and heavier range hydrocarbons. This new method, called NWTPH-Dx, reduces the background interference associated with vegetative matter by as much as 85 percent to 95 percent. However, even with the new methodology, TPH test results for street waste may still be biased by the presence of natural vegetative material and may still exceed 200 mg/kg. Where the laboratory results report no ‘fingerprint’ or chromatographic match to known petroleum hydrocarbons, the soils should not be considered to be petroleum contaminated soils.

Street waste solids frequently contain levels of carcinogenic PAHs (c-PAH) that make unrestricted use inappropriate. This is complicated further by analytical interference caused by organic matter that raises practical quantitation or reporting limits. To greatly reduce the level of interference, the use of U.S. EPA Test Method 8270, incorporating the silica gel cleanup step, is recommended. The calculated c-PAH value can vary greatly depending upon how non-detect values are handled. The new MTCA Method A criterion for c-PAH is 0.1 mg/kg (the sum of all seven c-PAH parameters multiplied by the appropriate toxicity equivalency factor) for unrestricted land uses. The MTCA criteria for soil cleanup levels for industrial properties is 2.0 mg/kg. Following this guidance, most sites where street wastes could be reused as soil will be commercial or industrial sites, or sites where public exposure will be limited or prevented.

Permitting of street waste treatment and storage facilities as solid waste handling facilities by the Tacoma-Pierce County Health Department is required. Under the Solid Waste Management Act, local health departments have primary jurisdiction over solid waste management.

Street waste handling facilities are subject to the requirements of the Solid Waste Handling Standards. The specific requirements will depend upon the manner in which the waste is managed. Most facilities will probably be permitted under the section dealing with Piles Used for Storage and Treatment (Section 320 of the regulation).

For most facilities, permit requirements include a plan of operation, sampling, record keeping and reporting, inspections, and compliance with other state and local requirements. The plan of operation should include a

procedure for characterization of the waste and appropriate reuse and disposal options, consistent with the recommendations in this document and applicable federal, state, and local requirements.

A street waste site evaluation (see sample at end of this appendix) is suggested for all street waste as a method to identify spill sites or locations that are more polluted than normal. The disposal and reuse options listed below are based on characteristics of routine street waste and are not appropriate for more polluted wastes. The collector of street waste should evaluate it both for its potential to be classified as dangerous waste and to not meet end users requirements.

Street waste that is suspected to be dangerous waste should not be collected with other street waste. Material in catch basins with obvious contamination (unusual color, staining, corrosion, unusual odors, fumes, and oily sheen) should be left in place or segregated until tested. Testing should be based on probable contaminants. Street waste that is suspected to be dangerous waste should be collected and handled by someone experienced in handling dangerous waste. If potential dangerous waste must be collected because of emergency conditions, or if the waste becomes suspect after it is collected, it should be handled and stored separately until a determination as to proper disposal is made. Street waste treatment and storage facilities should have separate “hot load” storage areas for such waste. **Dangerous Waste** includes street waste known and suspected to be dangerous waste. This waste must be handled following the Dangerous Waste Regulations (Chapter 173-303 WAC) unless testing determines it is not dangerous waste.

Spills should be handled by trained specialists. Public works maintenance crews and private operators conducting street sweeping or cleaning catch basins should have written policies and procedures for dealing with spills or suspected spill materials. Emergency Spill Response telephone numbers should be immediately available as part of these operating policies and procedures.

The end recipient of street waste must be informed of its source and may have additional requirements for its use or testing that are not listed here. This document is based primarily on average street waste's chemical constituents and their potential affect on human health and the environment. There are physical constituents (for example, broken glass or hypodermic needles) or characteristics (for example, fine grain size) that could also limit reuse options. Additional treatment such as drying, sorting, or screening may also be required, depending on the needs and requirements of the end user.

Street waste treatment and storage facilities owned or operated by governmental agencies should be made available to private waste collectors and other governmental agencies on a cost recovery basis.

Proper street waste collection and disposal reduces the amount of waste released to the environment. The operators of street waste facilities should restrict the use of their facilities to certified and/or licensed waste collectors who meet their training and liability requirements.

The use of street waste solids under this guidance should not lead to designation as a hazardous waste site, requiring cleanup under MTCA. Exceeding MTCA Method A unrestricted land use cleanup levels in street waste and products made from street waste, does not automatically make the site where street waste is reused a cleanup site. A site is reportable only if "a release poses a threat to human health or the environment" (Model Toxic Control Act). The reuse options proposed below are designed to meet the condition of not posing a threat to human health or the environment.

Testing of street waste solids will generally be required as part of a plan of operation that includes procedures for characterization of the waste. Testing frequency, numbers of samples, parameters to be analyzed, and contaminant limit criteria should all be provided as part of an approved plan of operation. Tables C.4 and C.5 below provide some recommended parameters and sampling frequencies for piles of street waste solids from routine street maintenance. These are provided as guidance only, and are intended to assist the county and the Tacoma-Pierce County Health Department in determining appropriate requirements. Sampling requirements may be modified, over time, based on accumulated data. When the material is from a street waste facility or an area that has never been characterized by testing, the test should be conducted on a representative sample before co-mingling with other material. Testing in these instances would be to demonstrate that the waste does not designate as dangerous waste and to characterize the waste for reuse. At a minimum, the parameters in Table C.4 are recommended for these cases. Note that it will generally not be necessary to conduct TCLP analyses when the observed values do not exceed the recommended values in Table C.4. Table C.6 illustrates some observed relationships between total metals and TCLP metals values.

For further information on testing methods and sampling plans, refer to:

- SW 846 (U.S. EPA, Office of Solid Waste, Test Methods for Evaluating Solid Wastes, 3rd Edition); and
- Standard Methods for the Examination of Water and Wastewater (American Public Health Association, et al., 18th Edition, 1992).

For street waste not exceeding the suggested maximum values in Table C.4, the following street waste solids reuse and disposal options are recommended:

- Street sweepings that consist primarily of leaves, pine needles and branches, and grass cuttings from mowing grassy swales can be composted. Litter and other foreign material must be removed prior to composting or the composting facility must provide for such removal as part of the process. The screened trash is solid waste and must be disposed of at an appropriate solid waste handling facility.

- Coarse sand screened from street sweeping after recent road sanding may be reused for street sanding, providing there is no obvious contamination from spills. The screened trash is solid waste and must be disposed of at an appropriate solid waste handling facility.

- Roadside ditch cleanings, not contaminated by a spill or other release and not associated with a stormwater treatment system such as a bioswale, may be screened to remove litter and separated into soil and vegetative matter (leaves, grass, needles, branches, etc.). The soils from these activities are not generally regulated as solid waste. Ditching material that may be contaminated must be stored, tested, and handled in the same manner as other street waste solids. It is the generator's responsibility to visually inspect and otherwise determine whether the materials may be contaminated.

- Construction street waste – solids collected from sweeping or in stormwater treatment systems at active construction sites – may be placed back onto the site that generated it, or managed by one on the methods listed below, provided that it has not been contaminated as a result of a spill. For concrete handling at construction site, refer to BMP C151 in Volume II, Construction Stormwater Pollution Prevention.

- Screened street waste soils may be used as feedstock materials for topsoil operations. This option should be reserved for street waste soils with very low levels of contaminants. Diluting street waste soils with clean soils or composted material must not be used as a substitute for treatment or disposal. There may be physical contaminants (for example, glass, metal, nails, etc.) in street waste that cannot be entirely screened from the waste. Where present, these contaminants in street waste could preclude its use as feedstock material for topsoil operations.

- Fill in parks, play fields, golf courses, and other recreational settings, where direct exposure by the public is limited or prevented. One way to accomplish is to cover the fill with sod, grass, or other capping material to reduce the risk of soil being ingested. The level of contaminants in the street waste must be

evaluated to ensure that the soils meet the definition of clean soils when used in this manner.

- Fill in commercial and industrial areas, including soil or top dressing for use at industrial sites, roadway medians, airport infields, and similar sites where there is limited direct human contact with the soil and the soils will be stabilized with vegetation or other means. The level of contaminants in the street waste must be evaluated to ensure that the soils meet the definition of clean soils when used in this manner.
- Top dressing on roadway slopes, road or parking lot construction material, road or parking lot subgrade, or other road fill. The level of contaminants in the street waste must be evaluated to ensure that the soils meet the definition of clean soils when used in this manner.
- Daily cover or fill in a permitted municipal solid waste landfill, provided the street waste solids have been dewatered. Street waste solids may be acceptable as final cover during a landfill closure. The Tacoma-Pierce County Health Department and landfill operator should be consulted to determine conditions of acceptance.
- Treatment at a permitted contaminated soil treatment facility.
- Recycling through incorporation into a manufactured product, such as Portland cement, prefab concrete, or asphalt. The facility operator should be consulted to determine conditions of acceptance.
- Other end-use as approved by the Tacoma-Pierce County Health Department.
- Disposal at an appropriate solid waste handling facility.

For street waste that exceeds the suggested maximum values in Table C.4, the following street waste solids reuse and disposal options are recommended:

- Treatment at a permitted contaminated soil treatment facility.
- Recycling through incorporation into a manufactured product, such as Portland cement, prefab concrete, or asphalt. The facility operator should be consulted to determine conditions of acceptance.
- Other end-use as approved by the Tacoma-Pierce County Health Department.

- Disposal at an appropriate solid waste handling facility.

Street Waste Liquids

Street waste collection should emphasize solids in preference to liquids. Street waste solids are the principal objective in street waste collection and are substantially easier to store and treat than liquids.

Street waste liquids require treatment and/or must follow location limitations before their discharge. Street waste liquids usually contain high amounts of suspended and total solids and adsorbed metals. Treatment requirements depend on the discharge location.

Discharges to sanitary sewer and storm sewer systems must be approved by the Industrial Pretreatment Program responsible for O&M of the system. Ecology will not generally require waste discharge permits for discharge of stormwater decant to sanitary sewers or to stormwater treatment BMPs constructed and maintained in accordance with Ecology's *Stormwater Management Manual for Western Washington* (see Volume V for further detail).

The following disposal options are recommended, in order of preference, for catch basin decant liquid and for water removed from stormwater treatment facilities.

Under the municipal general permit, municipalities are required to use this guidance in determining appropriate means of dealing with street wastes from stormwater maintenance activities. Ecology Southwest Regional Office water quality staff can help you with treatment standards and permit requirements for your particular situation.

Discharge of catch basin decant liquids to the municipal sanitary sewer is the <u>preferred disposal option</u>. Discharge to a municipal sanitary sewer requires the approval of the Industrial Pretreatment Program at (253) 798-3013. Street waste liquids discharged to a POTW may be treated at a combined street waste liquid and solid facility (decant facility) or at separate liquids only facilities. These liquid only facilities may consist of modified type 2 catch basins (with a flow restrictor or oil/water separator) or water quality vaults, strategically located through the sanitary collection system. These should provide 24-hour detention for the expected volumes and should be constructed and operated to ensure that the decant discharge does not resuspend sediments. Sewer authorities should require periodic sampling and decant facility operators should test their waste effluent on a regular basis, but street waste decant liquid should meet the most restrictive local limits with 24 hours of undisturbed gravity settling. Overnight settling is more practical and will likely meet most local pretreatment requirements. (See Table C.9 *Catch*

Basin Decant Values Following Settling for typical catch basin decant values from King County's decant facility at Renton.)

State and local regulations generally prohibit discharge of stormwater runoff into sanitary sewers to avoid hydraulic overloads and treatment performance problems. The volume of stormwater discharged from catch basins and small stormwater treatment facilities is generally not sufficient to be a problem, provided the discharge point is properly selected and designed.

Stormwater removed from catch basins and stormwater treatment wet vaults may be discharged into a basic or enhanced stormwater treatment BMP.

Decant liquid collected from cleaning catch basins and stormwater treatment wet vaults may be discharged back into the storm sewer system under the following conditions:

- The preferred disposal option of discharge to sanitary sewer is not reasonably available, **and**
- The discharge is to a basic or enhanced stormwater treatment facility (see Volume V), **and**
- The storm sewer system owner/operator has granted approval and has determined that the treatment facility will accommodate the increased loading.

Pretreatment may be required to protect the treatment BMP.

Reasonably available will be determined by the stormwater utility and by the circumstances, including such factors as distance, time of travel, load restrictions, and capacity of the stormwater treatment facility. Some jurisdictions may choose not to allow discharge back to the storm sewer system. Currently King County does not allow such discharges, under King County Code 9.12 – Water Quality.

Discharge back into the storm sewer is an acceptable option, under certain conditions:

- Other practical means are not reasonably available, **and**
- Pretreatment is provided by discharging to a modified type 2 catch basin (with a flow restrictor or oil/water separator) or water quality vault, **and**
- The discharge is upstream of a basic or enhanced stormwater treatment BMP, **and**

- The storm sewer system owner/operator has granted approval.

Other practical means includes the use of decanting facilities and field decant sites that discharge to sanitary sewers or discharge to an approved stormwater treatment BMP.

Limited field testing of flocculent aids has been conducted. While the use of flocculent aids is promising, sufficient testing has not been conducted to allow approval of any specific product or process. In general, the following conditions must be met for flocculent use to be approved:

- The flocculent must be non-toxic under circumstances of use and approved for use by Ecology.
- The decant must be discharged to an approved basic or enhanced stormwater treatment BMP, with sufficient capacity and appropriate design to handle the anticipated volume and pollutant loading.
- The discharge must be approved by the storm sewer system owner/operator.

Water removed from stormwater ponds, vaults, and oversized catch basins may be returned to storm sewer system. Stormwater ponds, vaults, and oversized catch basins contain substantial amounts of liquid, which hampers the collection of solids and poses problems if the removed waste must be hauled away from the site. Water removed from these facilities may be discharged back into the pond, vault, or catch basin provided:

- Clear water removed from a stormwater treatment structure may be discharged directly to a downgradient cell of a treatment pond or into the storm sewer system.
- Turbid water may be discharged back into the structure it was removed from if:
    - The removed water has been stored in a clean container (eductor truck, Baker tank, or other appropriate container used specifically for handling stormwater or clean water); and
    - There will be no discharge from the treatment structure for at least 24 hours.
- The discharge must be approved by the storm sewer system owner/operator.

Vegetation management and structural integrity concerns sometimes require that the ponds be refilled as soon after solids removal as possible.

For ponds and other systems relying on biological processes for waste treatment, it is often preferable to reuse at least some portion of the removed water.

Site Evaluation

A site evaluation is suggested as method to identify spill sites or locations that are more polluted than normal.

The site evaluation will aid in determining if waste should be handled as dangerous waste and in determining what to test for if dangerous waste is suspected. The site evaluation will also help to determine if the waste does not meet the requirements of the end users.

There are three steps to a site evaluation:

1. An **historical review** of the site for spills, previous contamination, and nearby toxic cleanup sites and dangerous waste and materials.

   The historical review will be easier if done on an area wide basis prior to scheduling any waste collection. The historical review should be more thorough for operators who never collected waste at a site before. At a minimum, the historical review should include operator knowledge of the area's collection history or records kept from previous waste collections.

   Private operators should ask the owner of the site for records of previous contamination and the timing of the most recent cleaning. Ecology's Hazardous Substance Information Office maintains a Toxic Release Inventory and a "Facility Site" Web page, tracking more than 15,000 sites. This information is available through the Internet at <http://www.wa.gov/ecology/iss/fsweb/fshome.html> or by calling a toll-free telephone number (800-633-7585). The Web page allows anyone with Internet access to search for facility information by address, facility name, town, zip code, and SIC code, etc. It lists why Ecology is tracking each one (NPDES, TSCA, RCRA, Clean Air Act, etc.), as well as who to call within Ecology to find out more about the given facility.

2. An **area visual inspection** for potential contaminant sources such as a past fire, leaking tanks and electrical transformers, and surface stains.

   The area around the site should be evaluated for contaminant sources prior to collection of the waste. The area visual inspection may be done either as part of multiple or as single site inspections. If a potential contaminant source is found, the waste collection should be delayed until the potential contaminant is assessed.

A second portion of the area visual inspection is a subjective good housekeeping evaluation of the area. Locations with poor housekeeping commonly cut corners in less obvious places and should be inspected in greater detail for illegal dumping and other contamination spreading practices.

3. **A waste and container inspection** before and during collection.

The inspection of the waste and catch basin or vault is the last and perhaps most critical step in the site evaluation.

For example, if the stormwater facility has an unusual color in or around it, then there is a strong possibility that something could have been dumped into it. Some colors to be particularly wary of are yellow-green from antifreeze dumping and black and/or rainbow sheen from oil and/or grease dumping. In addition, if any staining or corrosion is observed, then a solvent may have been dumped.

Fumes are also good indicators of potential dangerous or dangerous waste. Deliberate smelling of catch basins should be avoided for worker safety, but suspicious odors may be encountered from catch basins thought to be safe. Some suspicious odors are rotten eggs (hydrogen sulfide is present), gasoline or diesel fumes, or solvent odors. If unusual odors are noted, contact a dangerous waste inspector before cleaning the basin.

Finally, operator experience is the best guide to avoid collection of contaminated waste.

Table C.1. Typical TPH Levels in Street Sweeping and Catch Basin Solids.

Reference	Street Sweeping (mg/kg)	Catch Basin Solid (mg/kg)
Snohomish County (1) (Landau 1995)	390 – 4,300	
King County (1) (Herrera 1995)		123 – 11,049 (Median 1,036)
Snohomish County and Selected Cities (1) (W & H Pacific, 1993)	163 – 1,500 (Median 760)	163 – 1,562 (Median 760)
City of Portland (2) (Bresch)		MDL – 1,830 (Median 208)
Oregon (1) (Collins; ODOT 1998) Oregon (3) (Collins; ODOT 1998)	1,600 – 2,380 98 – 125	

(1) Method WTPH 418.1; does not incorporate new methods to reduce background interference due to vegetative material
(2) Method NWTPH-Dx.
(3) Method WTPH – HCID.

Table C.2. Typical c-PAH Values in Street Waste Solids and Related Materials.

Sample Source	City of Everett					WSDOT	
Analyte	Street Sweepings	Soil	3-Way Topsoil	Vactor Solids	Leaf & Sand	Sweepings Fresh	Sweepings Weathered
Benzo(a)anthracene	0.1U	0.076U	0.074U	0.21	0.45	0.56	0.40
Chrysene	0.14	0.09	0.074U	0.32	0.53	0.35	0.35
Benzo(b)fluoranthene	0.11	0.076U	0.074U	0.27	0.52	0.43	0.51
Benzo(k)fluoranthene	0.13	0.076U	0.074U	0.25	0.38	0.39	0.40
Benzo(a)pyrene	0.13	0.076U	0.074U	0.26	0.5	0.41	0.33U
Indeno(1,2,3-cd)pyrene	0.1U	0.076U	0.074U	0.19	0.39	NR	NR
Dibenzo(a,h)anthracene	0.1U	0.076U	0.074U	0.081	0.12	0.39	0.33U
Revised MTCA Benzo(a)pyrene [ND=PQL]	0.215	0.134	0.134	0.388	0.727	0.708	0.597
Benzo(a)pyrene [ND=½ PQL]	0.185	0.069	0.067	0.388	0.727	0.708	0.366
Benzo(a)pyrene [See * below]	0.185	0.069	0	0.388	0.727	0.708	0.366
Benzo(a)pyrene [ND=0]	0.155	0.001	0	0.388	0.727	0.708	0.135

*If the analyte was not detected for any PAH, then ND=0; If analyte was detected in at least 1 PAH, then ND=½PQL; If the average concentration (using ND=½ PQL) is greater than the maximum detected value, then ND=Maximum value.
The new Method A soil cleanup level for unrestricted land use is 0.1 mg/Kg for BAP. (WAC 173-340-900, Table 740-1).
The new Method A soil cleanup level for industrial properties is 2 mg/Kg for BAP. (WAC 173-340-900, Table 745-1).

Table C.3. Typical Metals Concentrations in Catch Basin Sediments.

Parameter	Ecology 1993	Thurston 1993	King County 1995	King County 1995
Metals; Total (mg/kg)	(Min – Max)	(Min – Max)	(Min – Max)	Mean
As	<3 – 24	0.39 – 5.4	4 – 56	0.250
Cd	0.5 – 2.0	<0.22 – 4.9	0.2 – 5.0	0.5
Cr	19 – 241	5.9 – 71	13 – 100	25.8
Cu	18 – 560	25 – 110	12 – 730	29
Pb	24 – 194	42 – 640	4 – 850	80
Ni	33 – 86	23 – 51	14 – 41	23
Zn	90 – 558	97 – 580	50 – 2,000	130
Hg	0.04 – 0.16	0.024 – 0.193		

Table C.4. Recommended Parameters and Suggested Values for Determining Reuse and Disposal Options.

Parameter	Suggested Maximum Value
Arsenic, Total	20.0 mg/kg (a)
Cadmium, Total	2.0 mg/kg (b)
Chromium, Total	42 mg/kg (c)
Lead, total	250 mg/kg (d)
Nickel	100 mg/kg (e)
Zinc	270 mg/kg (e)
Mercury (Inorganic)	2.0 mg/kg (f)
PAHs (Carcinogenic)	0.1 – 2.0 mg/kg (see Note at (g) below)
TPH (Heavy Fuel Oil)	200 – 460 mg/kg (see Note at (h) below)
TPH (Diesel)	200 – 460 mg/kg (see Note at (h) below)
TPH (Gasoline)	100 mg/kg (i)
Benzene	0.03 mg/kg (i)
Ethylbenzene	6 mg/kg (i)
Toluene	7 mg/kg (i)
Xylenes (Total)	9 mg/kg (i)

(a) Arsenic: from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses
(b) Cadmium: from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses.
(c) Chromium; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses
(d) Lead; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses
(e) Nickel and Zinc; from MTCA Table 749-2: Protection of Terrestrial Plants and Animals
(f) Mercury; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses
(g) PAH-Carcinogenic; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses and Table 745-1, industrial properties, based on cancer risk via direct contact with contaminated soil (ingestion of soil) in residential land use situations and commercial/industrial land uses. Note: The Tacoma-Pierce County Health Department may permit higher levels as part of a Plan of Operation, where they determine that the proposed end use poses little risk of direct human contact or ingestion of soil.
(h) TPH: from MTCA Tables 749-2 and 749-3: Protection of Terrestrial Plants and Animals. Values up to 460 mg/kg may be acceptable where the soils are capped or covered to reduce or prevent exposure to terrestrial plants and animals. Where the laboratory results report no 'fingerprint' or chromatographic match to known petroleum hydrocarbons, the soils will not be considered to be petroleum contaminated soils.
(i) BETX; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses.

Table C.5. Recommended Sampling Frequency for Street Waste Solids.

Cubic Yards of Solids	Minimum Number of Samples
0 – 100	3
101 – 500	5
501 – 1,000	7
1,001 – 2,000	10
>2,000	10 + 1 for each additional 500 cubic yards

Modified from Ecology's Interim Compost Guidelines.

Table C.6. Pollutants in Catch Basin Solids – Comparison to Dangerous Waste Criteria.

Parameter	Range of Values in Catch Basin Waste	Range of Values in Catch Basin Waste	Dangerous Waste Criteria
Metals	**Total Metals (mg/kg)**	**TCLP Metals (mg/kg)**	**TCLP values (mg/l)**
Arsenic	<3 – 56	<0.02 – 0 .5	5.0
Cadmium	<0.22 – 5	0.0002 – 0.03	1.0
Chromium	5.9 – 241	0.0025 – 0.1	5.0
Copper	12 – 730	0.002 – 0.88	none
Lead	4 – 850	0.015 – 3.8	5.0
Nickel	23 – 86	<0.01 – 0.36	none
Zinc	50 – 2,000	0.04 – 6.7	none
Mercury	0.02 – 0.19	0.0001 – 0.0002	0.2

Data from Thurston County (Thurston County 1993), King County (Herrera 1995) and Ecology (Serdar; Ecology 1993).

Table C.7. Typical Catch Basin Decant Values Compared to Surface Water Quality Criteria.

Parameter	State Surface Water Quality Criteria		Range of Values Reported	Range of Values Reported
Metals	Freshwater Acute (ug/l – dissolved metals)	Freshwater Chronic (ug/l – dissolved metals)	Total Metals (ug/l)	Dissolved Metals (ug/l)
Arsenic	360	190	100 – 43,000	60 – 100
Cadmium*	2.73	0.84	64 – 2,400	2 – 5
Chromium (total)			13 – 90,000	3 – 6
Chromium (III)*	435	141		
Chromium (VI)	0.5	10		
Copper*	13.04	8.92	81 – 200,000	3 – 66
Lead*	47.3	1.85	255 – 230,000	1 – 50
Nickel*	1114	124	40 – 330	20 – 80
Zinc*	90.1	82.3	401 – 440,000	1,900 – 61,000
Mercury	2.10	0.012	0.5 – 21.9	

*Hardness dependent; hardness assumed to be 75 mg/l

Table C.8. Typical Values for Conventional Pollutants in Catch Basin Decant.

Parameter (values as mg/l; except where stated)	Ecology 1993 Mean	(Min – Max)	King County 1995 Mean	(Min – Max)
PH	6.94	6.18 – 7.98	8	6.18 – 11.25
Conductivity (umhos/cm)	364	184 – 1110	480	129 – 10,100
Hardness (mg/l CaCO3)	234	73 – 762		
Fecal Coliform (MPN/100 ml)	3,000			
BOD	151	28 – 1,250		
COD	900	120 – 26,900		
Oil and Grease	11	7.0 – 40	471	15 – 6,242
TOC	136	49 – 7,880	3,670	203 – 30,185
Total Solids	1,930	586 – 70,400		
Total Dissolved Solids	212	95 – 550		
Total Suspended Solids	2,960	265 – 111,000		
Settleable Solids (ml/l/hr)	27	2 – 234	57	1 – 740
Turbidity (ntu)	1,000	55 – 52,000	4,673	43 – 78,000

Table C.9. Catch Basin Decant Values Following Settling.[1]

Parameter: Total Metals in mg/l	Portland – Inverness Site Min – Max	King County – Renton Min – Max	METRO Pretreatment Discharge Limits
Arsenic	0.0027 – 0.015	< MDL – 0.12	4
Cadmium	0.0009 – 0.0150	< MDL – 0.11	0.6
Chromium	0.0046 – 0.0980	0.017 – 0.189	5
Copper	0.015 – 0.8600	0.0501 – 0.408	8
Lead	0.050 – 6.60	0.152 – 2.83	4
Nickel	0.0052 – 0.10	0.056 – 0.187	5
Silver	0.0003 – 0.010	< MDL	3
Zinc	0.130 – 1.90	0.152 – 3.10	10
Settleable Solids; ml/L	No Data	0.02 – 2	7
Nonpolar fat, oil and grease	5.7 – 25	5 – 22	100
Ph (std)	6.1 – 7.2	6.74 – 8.26	5.0 – 12.0
Total Suspended Solids	2.8 – 1,310		
Recorded Total Monthly Flow; Gallons	Data not available	31,850 – 111,050	
Recorded Max. Daily Flow; Gallons	Data not available	4,500 – 18,600	25,000 GPD
Calculated Average Daily Flow; GPD	Data not available	1,517 – 5,428	

[1] Data from King County's Renton Facility (data from 1998 – 199) and the City of Portland's Inverness Site (data from 1999 – 2001); detention times not provided.