

1 protect water quality standards. The two particulars to which I will address my statement are the
2 augmentation of stream flow in SeaTac area streams, and the management of stormwater. Both
3 have severe and unacceptable implications for the quality of waters of the state of Washington.

4
5 4. During my professional career I served for five years as general manager of a
6 water supply utility that operated its own direct filtration potable water treatment system. I
7 trained water treatment plant operators in water treatment methods and related scientific
8 principles, supervised major overhauls and construction in the treatment plant, reviewed
9 engineering submittals, and held managerial responsibility for the operations, compliance, and
10 reporting for the plant. I held a Class 3 Water Treatment Operator certification from the State of
11 Washington for ten years.

12
13 5. In my consulting career I have designed and built water treatment systems based
14 on slow sand filtration, coagulation, and disinfection. I have spent much of my professional
15 career on assignments involving the relationship between land use and water quality, both surface
16 and groundwater. I am familiar with the King County Surface Water Design Manual, as well as
17 stormwater management guidance from other jurisdictions.

18
19 **Flow augmentation with stored stormwater is an unproven concept**

20 6. The Port of Seattle intends to augment the low summer flows of the streams in the
21 vicinity of SeaTac airport with stormwater from storage vaults. The Port relies on the success of
22 this plan to provide an element of reasonable assurance that the SeaTac Master Plan Update
23 construction will not violate water quality standards. The Port has not offered any precedent for
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-2

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1 this scheme, and the description of the project have been limited to vague generalities and
2 unsupported claims. The Port has furnished no design details for the flow augmentation
3 facilities, but has confined itself to promises only. Fendt (26) promises that the next iteration of
4 the Low Flow Analysis will contain all the identified missing pieces, and argues that this promise
5 is equivalent to reasonable assurance that the scheme will be implemented and will work.
6 Ecology did not have these essential elements when they issued the 401 certification, and the
7 PCHB does not have them now. Ecology even agrees that the Low Flow Analysis is incomplete
8 without these pieces, but attempted to fill the gap by making their submittal into a permit
9 condition. King County found the scheme to have some "unresolved design challenges"
10 (Whiting at 2).
11

12
13 7. The Port promises installation of floating orifices in stormwater storage basins.
14 The Port has provided no design detail, manufacturer's specifications, documentation, or
15 substantiation of the concept. It appears to have been mentioned for the first time in October
16 2001, by Fendt (28), and the reference is so general as to leave it entirely to the reviewer's
17 imagination what he is talking about.
18

19 8. The reviewer should expect to find dimensions and details of stormwater storage
20 vaults in the CSMP. They are not there. Fendt at 29 informs us that the CSMP is not intended to
21 show precise size of low flow mitigation vaults, only their probable locations. He suggests that
22 we look in the "Low Flow Mitigation Plan (sic - presumably the Low Streamflow Analysis -
23 Summer Low Flow Impact Offset Facility Proposal) as the place to find details for those systems.
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1 They are not there, either. The Port has failed to provide even the most basic information needed
2 to evaluate its low flow mitigation proposal.

3 9. The Port has not refined the concept of stormwater for flow augmentation even to
4 the extent of being sure which streams will receive it. The low flow augmentation plans before
5 December 2000 were limited to Des Moines Creek. The December 2000 Low Flow Analysis
6 said flows would be augmented in Des Moines and Miller Creeks. The "final" Low Streamflow
7 Analysis/Summer Low Flow Impact Offset Facility Proposal of July 2001 showed an intention to
8 apply augmentation flows to all three streams. Fendt (17) says flow augmentation will be applied
9 to Des Moines and Walker Creeks. The flow augmentation proposal is no more than a draft
10 concept, with uncertainty and questions of feasibility behind every detail. It will not serve as a
11 basis for reasonable assurance that it will work.

12 10. The Port's concept of low flow augmentation with stored stormwater would be
13 strengthened by a demonstration that a comparable scheme has been successfully implemented
14 elsewhere. The Port offers no such demonstration, even for separate elements of the concept
15 such as the ability of a vault to maintain water quality at the end of six months of storage. The
16 Port offers a promise to figure out the details in the future.

17 11. I have encountered numerous low flow augmentation projects in the course of
18 more than two decades of work in the water resources field. I have not encountered any low flow
19 augmentation plan that depended on multiple season storm water storage for a water source.

20 12. I have had experience with low flow augmentation plans, and will briefly describe

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1 three of them for illustrative purposes. One is a flow-proportional discharge required under a
2 water rights certificate for a municipal water supply well. Because of a finding that the well
3 withdrawal depleted stream flow, the certificate was conditioned on release to the stream of a
4 portion of the withdrawal. The release to the stream is part of the water right. The second
5 instance involves a new appropriator who changed the place of use of a water diversion and in
6 the process wished to discontinue the use of a ditch. The amended water right requires that the
7 new appropriator continue a part of the flow in the ditch to provide for wetlands and a stream that
8 depend on conveyance losses, or seepage. The portion required for flow augmentation is the
9 subject of a water right. The third instance includes the common requirement that releases from
10 a surface reservoir provide for minimum downstream flows and specified ramping rates. The
11 flow releases for streamflow maintenance are the subject of both a water right and a storage
12 permit.
13

14 **Stormwater quality will not be acceptable**

15
16 13. POS has claimed to be investigating the feasibility of emerging BMP technologies
17 and doing research on filter media for metals removal (Logan, 7; 16). Media filtration is widely
18 known in the drinking water industry. Typically it forms one component of a water treatment
19 train that includes such steps as chemical conditioning, coagulation, and flocculation. The newly
20 released Stormwater Management Manual for Western Washington, Volume V - Runoff
21 Treatment BMP's, clearly expects the application of such advanced treatment technologies where
22 removal of dissolved metals is an issue (p. 141). The 401 Certification contains no requirement
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1 for the Port to implement any measures beyond the King County Basic Water Quality Menu,
2 which is designed for sediment removal. Ecology has accepted this simplistic approach, despite
3 the demonstrated problems of dissolved metals in the Port's stormwater discharges and the
4 widespread recognition, including in Ecology's new manual, that means are available to address
5 these types of pollution problems. The Port and Ecology are incorrect to assert that compliance
6 with the King County Surface Water Design Manual equates to compliance with water quality
7 standards.
8

9 14. The Port chose their stormwater BMP's from the King County Basic Water
10 Quality Menu, which is designed to remove 80% of total suspended solids and not designed to
11 remove other pollutants. Filter strips are part of the Basic Water Quality Menu (KCSWDM, p. 6-
12 4). Stormwater treatment means filter strips (Fendt 41). Filter strips have been shown to vary
13 widely in their removal performance for metals, even showing negative removals or re-
14 mobilization (EPA Urban Stormwater Best Management Practices Study referred to in first
15 Willing Decl., Exhibit G).
16

17 15. The Port (p. 26) claims that its selection of BMP's are effective at removing
18 "many organic and inorganic particles." They make no claim that they effectively remove metals
19 in the dissolved state. Ecology (p.22) says that "although the Port's proposed BMP's are not
20 designed to treat metals, they may be partially effective in doing so . . . to the extent metal
21 particulates comprise a portion of total suspended solids in the Port's stormwater discharges, the
22 BMP's may be partially effective in removing them." The "partially effective" language appears
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1 to have come from Whiting (declaration p. 5). However Ecology chose not to quote it in its
2 entirety. He went on to say, "However, the effectiveness of the proposed BMP's, primarily
3 biofiltration, at removing non-particulate (soluble) metals is expected to be minimal." (*Id.*) Mr.
4 Whiting is correct. The Port's BMP's will not remove a large portion of the metals from the
5 airport stormwater. If the Hearings Board is looking for the language of reasonable assurance, it
6 will be sorely disappointed: all it will find is that Ecology's provisions in the 401 certification "
7 . . . may be partially effective . . ."

9 16. Ecology relies heavily on King County's ostensible stamp of approval for the low
10 flow mitigation and stormwater management plans. On close scrutiny however, the King County
11 review is not a stamp of approval at all. The review, carried out by stormwater engineer Kelly
12 Whiting, was very limited in scope and critical in content.

14 17. The scope of Mr. Whiting's review was limited to ascertaining whether the
15 Comprehensive Stormwater Master Plan for the SeaTac Master Plan Update attained minimum
16 compliance with the technical provisions of the 1998 King County Surface Water Design
17 Manual. The review did not evaluate compliance with other King County or state documents
18 such as the Governor's Certification. It did not consider whether the proposed stormwater plan is
19 in compliance with the Federal Clean Water Act or state water quality standards. (Scope of
20 work, attachment 1 to King County DNR Interagency Agreement #C0000141, September 8,
21 2000, attached hereto as Exhibit A). Specifically excluded from the review scope were all
22 procedural requirements of the KCSWDM. If processed under King County regulations, this
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1 project would have exceeded the threshold for Large Site Drainage Review and would have been
2 subject to the procedural requirements whereby performance standards are tailored specific to the
3 proposed development (King County Final Review Comments, August 2000 Preliminary
4 Comprehensive Stormwater Management Plan, September 14, 2000, attached hereto as Exhibit
5 B). Mr. Whiting did not review the models for the proposed embankment and offers no
6 comments on the accuracy of predictions derived from these models: (Whiting Exhibit 2 p 2).
7 Review of the Low Flow Analysis was added to the King County scope after the appearance of
8 the December 2000 version.
9

10 18. Even within his constrained scope of review, Mr. Whiting did not find adequate
11 provision for protecting water quality in the Port's selection of stormwater best management
12 practices. He said, "Discharge monitoring data indicates high copper (Cu) concentrations and
13 low total suspended solids off of the existing runway areas. This would tend to indicate most of
14 the Cu is in the more toxic dissolved form. As current runways are being treated with the same
15 water quality treatment BMP's as proposed for the third runway, similar results may be expected.
16 Compliance with KCSWDM basic water quality menu may not be sufficient to control metals,
17 nor are the BMP's found in the basic menu intended to adequately control metals." This
18 comment went unanswered and was repeated verbatim in review comments on the December
19 2000 version of the stormwater plan. Whiting continued: "Filter Strips - removal of metals is not
20 the performance goal of this facility. The existing relatively high Cu concentrations off the
21 runways indicate they are not great at metals removal. Since the 3rd runway will be treated with
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1 the same filter strip BMP's, the water quality off the 3rd runway would be expected to be
2 similarly high. If SMP is targeting enhanced water quality treatment for metals removal, BMP's
3 should be selected from the KCSWDM Resource Stream Water Quality Menu. This level of
4 treatment is consistent with previous 401 conditions. Note: Under the KCSWDM Large Site
5 Drainage Review process, mitigations are tailored specific to each project. If this project was to
6 comply with the procedural requirements of the KCSWDM, enhanced water quality treatment
7 may have been required." (King County Final Review Comments, August 2000 Preliminary
8 Comprehensive Stormwater Management Plan, September 14, 2000, Enclosure 1, p. 7; Enclosure
9 2, p.2). Enhanced water quality treatment consists of media filtration, two-facility treatment
10 trains, etc. (KCSWDM section 6.1.3). Whiting also commented on the Port's "Inconsistencies
11 and gaps in data . . . several of them have the potential to affect facility design and plan
12 effectiveness beyond a trivial amount." Whiting Exhibit 2 p 1 para 4.

15 19. The Port's stormwater management plan falls far short of All Known and
16 Reasonable Technology. They promise to "retrofit the airport for water quality BMP's to the
17 extent practicable" (Fendt 60). The Port understands Ecology to say that the Port's stormwater
18 plan constitutes AKART (Fendt 21). Ecology says water quality standards will be met because the
19 stormwater plan meets, and goes beyond, the technical requirements of the KCSWDM. But
20 Whiting says that KCSWDM is not AKART. First Eglick Decl., Exhibit J. In my opinion,
21 AKART for the Port's stormwater discharges would consist of a convincing demonstration that
22 the Port has researched and designed advanced treatment techniques, as described in both the
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1 King County and Ecology stormwater manuals, and devised a suite of best management practices
2 tailored to the constraints and flow characteristics of the airport.

3
4 20. The concept of a Water Effects Ratio Study, under which modifications to water
5 quality standards may be proposed and granted, appears several places in Port declarations (Port
6 24; Logan 19-27; Fendt 43). The relevant authority is in WAC 173.201A.040. The essence of
7 the Port's purpose in discussing it is that it allows them to argue for a relaxation of the water
8 quality standards that apply to the Port. This is a curious stance, in light of Port claims to be
9 meeting existing water quality standards (Port 23). The WAC says "the department shall ensure
10 there are early opportunities for public review and comment on proposals to develop revised
11 criteria." So far there has been no such review and comment. The attachment of the Port's
12 February 1999 Water Effects Ratio Study to the Logan Declaration (Attachment C) is the first
13 public release of this information.
14

15 21. The Port (Logan 23 et seq; Fendt 43; memorandum 23) and Ecology (Kenny 23;
16 Fitzpatrick 5) devote considerable space to the benefits of doing a WERS. The logic of the
17 WERS discussion is flawed however. The Port's memorandum and Logan both claim that two
18 range-finding WERS studies have been done by the Port. One has been furnished for the record;
19 the other is not in evidence in this case to the best of my knowledge. By way of arguing for the
20 sufficiency of the 401 certification, Fitzpatrick explains that it requires an as-yet-to-be-completed
21 WERS study which will supply new water quality criteria for copper and other metals that can be
22 incorporated in the next renewal of the Port's NPDES permit. Fendt (43) interprets the
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1 preliminary WER analysis (without saying which one, or explaining the logic) to show that the
2 BMP's from the King County Basic Water Quality Menu are adequate to treat SeaTac
3 stormwater. Logan (25) reports that copper water effects ratios for Miller, Walker, and Des
4 Moines Creeks ranged from 7 to 16. She did not show a derivation for these values nor explain
5 how a derivation works. She then concludes that development of site-specific standards are
6 feasible for SeaTac airport.
7

8 22. The cryptic explanations found in Fendt and Logan entice the reader to look
9 closely at the actual document (Water Effect Ration Screening Study at Seattle-Tacoma
10 International Airport: Toxicity Evaluation of Site Water. Parametrix, February 1999). Important
11 pieces of information are missing from this report. The work was evidently intended to evaluate
12 the toxicity of stormwater, so it was carried out during a rainstorm. No hyetograph or
13 hydrograph of the rainstorm is included in the report. To form a judgment as to what the study
14 was actually investigating, the reviewer would need to understand the time distribution of rainfall
15 and resultant streamflow, and how the sample collection effort related to these time distributions.
16 The only information available on this point is that sample collection did not start until fourteen
17 hours after the onset of a substantial rainstorm. It is very likely that such a fourteen hour delay
18 would result in very dilute stormwater that would not accurately represent the water quality or
19 metals concentrations in the streams or stormwater discharges.
20

21 23. Instead of showing actual stream hydrographs from available gauging stations for
22 the period of the tests, the 1999 WERS report shows hydrographs that were produced with the
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1 HSPF model. The report does not say which implementations of the HSPF model were used, or
2 how well they were calibrated, or if they were calibrated. The report also fails to relate the
3 ostensible streamflow to either the rainfall or to the sampling events.
4

5 24. The reviewer is forced to the conclusion that the 1999 WERS study does not show
6 anything, certainly not that the development of site specific standards is feasible, or that it
7 provides a basis for determining that water quality standards will not be violated.

8 **Stormwater violations of water quality standards has not been acceptable**

9 25. The only reason Ecology is able to claim that there is no violation of water quality
10 standards is that they do not require the Port to take sufficient samples to show a violation. This
11 is not a basis for reasonable assurance. Even if standards did apply to receiving waters only,
12 which they do not, the discharge concentrations are sufficiently high and the receiving flows are
13 sufficiently small that a violation in the receiving water is inevitable.
14

15 26. Ecology's position on mixing zones is confusing and contradictory.

16 Some amount of mixing should be allowed given that the application of BMP's satisfies
17 the requirement for AKART. Mixing zone analysis to determine dilution factors is a very
18 complicated modeling problem for stormwater. Assuming no mixing zone, the
19 stormwater discharges from Sea-Tac Airport show reasonable potential to violate the
20 water quality criteria for copper, lead, and zinc.

21 Port NPDES Fact Sheet, p. 29, February 20, 1998. Notwithstanding this statement, the Port's
22 NPDES permit does not authorize mixing zones at its outfalls to Des Moines, Miller, and other
23 streams. Allowing the Port to discharge stormwater at pollutant concentrations above water
24 quality standards is a de facto authorization of a mixing zone, because the concentrations in the
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1 end of the pipe cannot meet the standards without dilution. The flows available for dilution are
2 potentially very low in receiving waters.

3 **Violations impossible to document under current sampling regime:**

4
5 27. POS has adopted, and Ecology has approved, water quality sampling practices
6 that make it impossible for the Port, Ecology, or the public to know whether or not a violation of
7 water quality standards has happened. This avoidance of unpleasant data is now used as a basis
8 for reasonable assurance that there are no violations (Fitzpatrick at 6).

- 9 • NPDES permit no. WA-002465-1 does not require the permittee to collect or report water
10 quality data that are necessary to ascertain whether a given concentration of metals is
11 above or below water quality criteria. First Willing Decl., Exhibit F.
- 12
13 • Stormwater is inherently variable - depending upon the nature of the storm event, the
14 number of dry days prior to the storm event, the nature of the surface over which it drains,
15 and other factors (Logan at 9). Thus it is impossible for the Port or Ecology to know
16 whether the Port's sparse sampling regime catches samples that are representative of true
17 pollutant concentrations.
- 18
19 • Numeric water quality criteria for metal pollutants are a function of hardness (WAC 173-
20 201A-040). Hardness data is not reported on the monthly DMR's (Discharge Monitoring
21 Reports).
- 22
23 • The Port of Seattle's Annual Stormwater Monitoring Reports for SeaTac Airport have the
24 same deficiency concerning hardness data as the DMR's. First Willing Decl., Exhibit F.

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I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

DATED this 24 day of October, 2001, at Bellingham, Washington.

Peter Willing

Peter Willing, Ph.D.

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DECLARATION OF DR. PETER WILLING IN SUPPORT OF ACC'S MOTION FOR STAY-14

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