3.6 Flooding Potential

3.6.1 Existing Conditions

The proposed S2GF lies within the 100-year floodplain of the Sumas River and Johnson Creek, as identified in a flood insurance study completed in 1984 by the Federal Emergency Management Agency (FEMA). The 100-year floodplain map presented in Figure 3.6-1 was produced as a result of that study and is based on an estimated flood elevation of 44 feet, tied to the National Geodetic Vertical Datum (NGVD). Construction of the S2GF would require filling approximately 17 acres of the nearly flat-lying ground. The resultant fill pad would raise the final grade of the S2GF above the 100-year flood elevation, but would potentially result in increased flood damage to the surrounding areas.

As a means of evaluating the potential for the developed S2GF site to result in higher flood elevations in nearby areas, the FEIS included the results of a flood analysis completed in 1997 by KCM, Inc. on behalf of the city of Sumas. That analysis consisted of applying a two-dimensional steady-state flood modeling system to predict the areal extent, depth, and velocity of water throughout the city during a 100-year flood event. The model was used to evaluate the extent of the 100-year floodplain and the peak flow elevation both before and after the complete hypothetical future filling (above flood elevation) of the approximately 200-acre industrial-zoned area on the west side of the city, as portrayed in Figure 3.6-1. Based on the assumption of filling this entire industrial area, including the S2GF site, the model predicted that the impact on water surface elevations was less than 1 foot throughout the city. The most noticeable difference was south of the cogeneration facility in the vicinity of Johnson Creek. This area was predicted to experience up to about a 1-foot increase in flood elevation, based on a memo dated July 8, 1997 prepared by KCM (provided in Appendix A of the FEIS).

Although the KCM analysis is useful in evaluating the cumulative impact of filling the entire industrial area, application of these modeling results to evaluate the impact that construction of the S2GF would have on flooding likely overestimates the extent to which nearby areas would be affected by the SE2 project alone. The change in flooding that is predicted by the KCM analysis is based on filling the entire industrial-zoned area. It does not evaluate the extent to which filling of only the project site would affect flooding of nearby properties. As shown in Figure 3.6-1, the project site comprises only a small part of the overall industrial-zoned area, most of which has yet to be filled. Moreover, the site area comprises less than 10% of the undeveloped industrial area that is located within the 100-year floodplain. A separate flood analysis by David Evans & Associates for a property located immediately to the north of the S2GF site predicted that a 2-inch rise in the 100-year flood elevation would result from filling of that site, which is somewhat smaller than the S2GF site (David Evans & Associates 1996). While these results cannot be applied directly to the S2GF site, they do provide a perspective as to what the minimum potential impact the filling for this project might have on flooding.

The KCM modeling evaluated the potential effects that filling the complete 200-acre industrial area would have on flooding during the 100-year event. Their analysis did not address the impacts of the 10-, 25-, and 50-year flood events. Since the S2GF site lies within the 50-year floodway (based on observations during the 1990 flood), and possibly within the floodway of smaller events, modeling of these smaller events would be useful in predicting what effect construction of the site might have on these smaller floods. It would also be useful in determining whether any mitigation measures would be required to offset any adverse impacts during these lower flood events.

The KCM modeling used a two-dimensional steady-state model, which does not take into consideration relative differences in flood conditions resulting from loss of floodplain storage. Rather, the steady-state model routes only peak flow rates and can only account for differences in flood levels and velocities resulting from loss of floodplain conveyance. Consequently, this aspect of the steady-state model that was used in the KCM analysis may underestimate the effects of flooding on nearby properties. Nevertheless, since the site comprises only a small area within the very wide floodplain, the magnitude of this underestimation is expected to be small.

Considering the importance of flooding in the project area and the limitations of the currently available flood modeling, it was recommended in the FEIS that an unsteady-state flood model be run to provide a more complete assessment of off-site impacts from filling the S2GF site. An unsteady-state flood model would account for changes in both flood conveyance and storage, thereby providing a more reliable estimate of the flood impacts that site filling would have on nearby properties. Such a model is being developed by the Whatcom County Public Works Department to evaluate the Everson-Sumas River overflow corridor. The FEIS also indicated that if this unsteady-state modeling identifies unacceptable impacts on nearby properties, compensatory measures should then be designed specifically to mitigate these impacts.

3.6.2 Changes Related to Flood Modeling

The Second Revised ASC indicated that SE2 proposed to perform site-specific unsteady-state flood modeling for the 10-, 25-, 50- and 100-year flood events prior to project construction, to evaluate potential adverse off-site impacts resulting from filling the S2GF site. Since completion of the Second Revised ASC, SE2 has adapted the unsteady-state model to analyze flood impacts at the S2GF site. The model has been calibrated to the 1990 flood, and will be run at up to 150% of the peak flows recorded to approximate the 100-year event. However, results are still not available because SE2 and Whatcom County are refining the model. Once this model is available, it would be expected to provide more reliable results than have been obtained to date on flood routing and storage, and the potential adverse impacts related to flooding that are associated with the project. SE2 has indicated that it would also use the model to identify and evaluate any reasonable mitigation measures that might be required to compensate for adverse effects of constructing the S2GF.

Figure 3.6-1

INSERT 11 X 17 “100-YEAR FLOODPLAIN AREA”

3.6.3 Environmental Impacts

At this time, it is not known what the results of the unsteady-state flood modeling will indicate with respect to the potential impacts of flooding, or how the results will compare with the existing steady-state analysis. The steady-state analysis, on one hand, likely overestimates the effect the site would have on raising the 100-year flood levels based on conveyance. In contrast, it does not account for the effect of loss of floodplain storage, which would likely underestimate the effect of the site on the flood level. This underestimate may be less significant for the 100-year flood than for smaller floods if the site lies within the smaller floodway. During a 100-year flood, the flood storage displaced by the site would be relatively small in proportion to the overall floodway, whereas during a smaller flood, the flood storage that is displaced by the site, and therefore the potential impact, may be relatively large in proportion to the size of the overall floodway.

3.6.4 Mitigation Measures

The Second Revised ASC indicates that SE2 will evaluate and propose recommendations for reasonable mitigation of any adverse off-site flooding impacts identified by the unsteady-state modeling. In subsequent correspondence, SE2 has indicated that if no increase in floodplain elevation is allowed from development of this site, mitigation measures might include excavating nearby floodplain areas not directly associated with surface water bodies to increase the hydraulic capacity of the remaining floodplain area. Depending on the location and size of these mitigation areas, they too might require further mitigation to offset any adverse impacts that might result. For instance, excavation to increase flood storage could result in loss of specific terrestrial habitat that would need to be mitigated. Although it is not known what, if any, mitigation measures might be required, it is possible that off-site landscape modifications would be needed. This would require the applicant to make arrangements with one or more third parties to implement appropriate mitigation measures and to obtain EFSEC review and approval prior to implementation.