US Army Corps of Engineers®
Seattle District

FACT SHEET - Howard A. Hanson Dam

June 2014

Situation:

After completing, testing and monitoring dam safety improvements, U.S. Army Corps of Engineers' scientists and engineers have confirmed initial conclusions that the Corps can operate the Howard A. Hanson Dam to hold water to its full pool as designed. Technical experts confirm that the Corps can hold water behind the dam to an elevation of 1,206 feet above sea level with low risk to the dam and pass spillway flood events when storage above elevation 1,206 feet is required for extreme events. The Corps has finished a detailed dam safety study to ensure all significant and credible risks have been evaluated. This summer's final report by the Corps has also verified that the risk reduction measures completed between 2010 and 2012 have further reduced the dam's overall risk by an order of magnitude. Drains through the area of highest concern, known as the short path seepage area, were completed and tested in 2011. Engineers, geologists and other scientists ran a battery of tests to gather more data on the completed right abutment drainage improvements when the reservoir behind Howard Hanson Dam reached a summer elevation of 1,167 feet above sea level in June 2011. Test findings led the Corps to operate the dam without reservoir restrictions again beginning in 2011. Additionally, two other features that were determined to pose unacceptable risk, debris blocking the spillway and erosion of the upstream dam embankment during a spillway use flood event, were addressed by installing new log booms and spillway erosion protection work that was completed in 2012.

Key Points:

- Experts have confirmed that work completed from 2010 to 2012 allows the Corps to operate Howard Hanson Dam to its design capacity with low risk.
- The Corps has been operating Howard A. Hanson Dam since the 2011-2012 flood season without any water storage restrictions.
- Results from testing and monitoring underway since 2009 have assured technical experts that the dam can be operated to its design capacity – a reservoir pool elevation of 1,206 feet above sea level.
- However, until the dam experiences a flood above summer pool level (1,167 feet), there is not 100 percent certainty of how the new measures will perform.
- The return of full operational capacity of Howard A. Hanson Dam, in partnership with a functioning levee system downstream does not eliminate all risks of flooding. The dam, dedicated in 1962, never eliminated all risks of flooding. Our confidence is high however, that the dam and levees do reduce the risk of flooding.
- Public safety is the Army Corps' number one priority. The Corps works with local communities to prepare for the risk of flooding to downstream areas using the best available information and technology.
- The Corps built additional projects to increase confidence that the dam can operate with low risk during extreme flood events (maximum flood pool is elevation1,224 feet) when pools above elevation 1,206 feet would involve use of the spillway.
- If you live in the flood plain, it is important to know your risk and be prepared. Property owners should consider continuing their flood insurance, as suggested before the 2009 events.

Background:

Following a record-high water level behind Howard A. Hanson Dam in January 2009, the U.S. Army Corps of Engineers, Seattle District, became concerned after discovery of two depressions on the right abutment, increased water levels in groundwater monitoring wells and the appearance of sediment-laden water entering the abutment drainage tunnel. These concerns compelled the Corps to limit the dam's operational capacity, in order to not put it at further risk. While the dam itself was not in immediate danger of failing, there was increased risk to downstream communities until seepage concerns with the right abutment were resolved. The Corps of Engineers

immediately placed restrictions on flood storage and established an aggressive monitoring program, in addition to other risk reduction measures. Reduced flood storage capacity could have resulted in more frequent and larger volume releases during flood events, which increased the probability that levees in the lower valley could be overtopped. Repairs and improvements to the project have been completed and have reduced this risk. Features of the repairs included constructing a seepage barrier (grout curtain) and making improvements to drainage in the abutment. In February 2012 inflow to the dam was high enough to rank in the top 10 flood events in Howard A. Hanson Dam's history, but many may not have realized the potential impact because the dam functioned according to design. Without Howard A. Hanson Dam holding back flows, estimated flows on the Green River would have been near 22,000 cubic feet per second, nearly double the river's maximum design flow of 12,000 cubic feet per second measured in Auburn, Wash.

Additional Background Information:

Howard A. Hanson Dam is located on the upper reach of the Green-Duwamish River in King County, 63 river miles above the mouth. It is in the city of Tacoma's municipal watershed 35 road miles east of Tacoma, 6 miles upstream from Palmer. This project is protected from public access.

The Howard A. Hanson Dam serves multiple purposes by providing flood risk reduction, municipal water supply and summer and fall low flow augmentation for fish. Flood risk reduction in the Green-Duwamish River Basin is accomplished by capturing excessive water runoff from the upper drainage area of the river and releasing the water under controlled conditions. After the end of the annual winter flood season, water is gradually stored in the reservoir beginning about March 1 for municipal water supply and for conservation (low flow augmentation) purposes.

Flood damage prevented by Howard A. Hanson Dam from the January 2009 flood is estimated at about $6 billion. ($17 billion damages prevented since 1962).

The dam is an earth and rockfill structure with inclined core drain and filters. Outlet works on the left bank consist of an approach channel, an intake structure providing upstream control, a 19-foot diameter horseshoe concrete-lined tunnel, a stilling basin, and an auxiliary 48-inch diameter bypass pipe. A gated spillway on the left abutment with two 45 by 30-foot tainter gates permits reservoir storage to elevation 1,206 without utilizing the spillway for discharge. The paved spillway chute is 656 feet long.

The Corps of Engineers constructed a seepage barrier in November 2009 to reduce seepage and improved the drainage of the right abutment by installing drains that more effectively direct seepage into the drainage tunnel. Testing showed that the work controlled seepage more effectively. However, the 2009 grouting was not considered a permanent repair.

Along with controlling seepage in the right abutment by installing additional vertical and horizontal filtered drains, the Corps built additional projects to increase confidence that the dam can operate with low risk during extreme flood events (i.e., pools above elevation 1,206 feet that involve use of the spillway). These measures, completed in 2012, include: installing additional log booms to prevent debris from blocking the spillway and placing large rock along the upstream face of the dam to protect it against erosion from fast-moving water in the event the spillway is used.