Hazardous Materials Risk Assessment

This plan is an update of the 2004 City of Redmond Hazard Mitigation Plan (HMP). Although it is an update, this document has been redesigned so that it looks, feels, and reads differently than the original. This is due to several factors: new hazard information has become available that drives new definitions of risk, the City has matured and new capabilities are now available, and the new format will allow readers to more easily understand the content. In addition, the 2004 HMP included several action items that have been completed, creating an opportunity for developing new mitigation strategies.

12.1 Identify Hazardous Materials Hazards

The EPA defines hazardous materials as liquid, solid, contained gas, or sludge wastes that contain properties that are potentially harmful to human health or the environment.[136] Hazardous materials are typically released in the form of spills, leaks, or vapor emissions. These are known as either a point source release that can be traced back to a single origin, or non-point source releases that occur incrementally, slowly polluting the environment.

Non-point source hazardous materials are difficult to track and control. Facilities that contain large quantities of hazardous materials are regulated to reduce the risk of point source spills. These facilities are categorized as Tier II facilities, which are defined as those that equal or exceed the thresholds of hazardous materials listed under Section 311(e) of Title III of the Superfund Amendments and Reauthorization Act (SARA).[137]

Tier II facilities are required to complete a Tier II Emergency and Hazardous Chemical Inventory report by The Washington State Emergency Response Commission (SERC). These facilities are also required to report to the Local Emergency Planning Committee (LEPC), and local fire department. Tier II storage facilities are required to comply with federal safety requirements and are regulated by the U.S. Environmental Protection Agency.

12.2 Profiling Hazardous Materials Hazard Events

A. Location

Both point source and non-point source pollution is likely to occur where hazardous materials are located. **Map 33, City of Redmond Tier II Hazardous Material Facilities,** shows the location of all facilities that keep significant amounts of chemicals on site. Point source releases are more easily identified. While non-point source pollution can also occur where hazardous materials are present, such releases may not be

136 U.S. Environmental Protection Agency, "Wastes–Hazardous Waste," http://www.epa.gov/osw/hazard/index.htm.

137 Emergency Planning and Community Right-to-Know Act (EPCRA), "Hazardous Chemical Storage Reporting Requirements," U.S. Environmental Protection Agency, http://www.epa.gov/oem/content/epcra/epcra_storage.htm.

immediately recognizable. Both types of releases can occur either on location where the hazardous materials are stored, or along transportation routes.

The Olympic Pipeline is another potential source for a hazardous material spill. Located along the western edge of the City of Redmond, it transfers millions of gallons of jet fuel, gasoline or diesel daily.

B. Timing and Duration

The time component of point source hazardous materials incidents can range from hours to days. Factors contributing to the duration and subsequent severity of hazardous materials events are the ability of local and/or regional transportation agencies, incident response, and toxic chemical handlers to respond to the event. Non-point source hazardous material release occurs slowly over an extended period of time.

C. Severity

According to the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA), hazardous materials are most dangerous when they are first released from containment, and the severity of an event depends on the chemical and biological components of the material released.[138] A significant number of Tier II facilities in Redmond hold supplies of sulfuric acid or gasoline/diesel. Sulfuric acid is described as "more hazardous than most chemicals" by 7 out of 10 ranking systems and is one of the most prolific chemicals produced in the United States. However, an extensive web of federal, state, and local regulations effectively limits the probable impacts and severity of a point source hazardous materials incident.

D. Frequency

Previous Occurrences

Sulfuric acid is listed as the second most common Tier II hazardous material in Redmond. There have been no reported point-source releases of the Tier II hazardous material, sulfuric acid, in Redmond (zip codes: 98052, 98053, 98073).[139] No point-source releases of any Tier II chemicals previously been reported in Redmond. Non-Tier II point-source releases are unknown, and are more difficult to identify due to less stringent regulation than Tier II hazardous materials. Non-point source releases are not monitored, and therefore no records exist of their previous occurrences.

Probability of Future Events

An increase in hazardous material facilities due to the projected growth of the City will increase the potential for both point source and non-point source events.

138 U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. "Incident Reporting." http://phmsa.dot.gov/hazmat/incident-report

139 Environmental Defense Fund, "Scorecard, the Pollution Information Site," http://www.scorecard.org.

12.3 Assessing Hazardous Materials Vulnerability

12.3.1 Overview

Although there are numerous sites in Redmond that contain sizable amounts of Tier II hazardous materials, the stringent regulations for handling, storage, transport, and recording of Tier II hazardous materials and related facilities limit the vulnerabilities. However, the presence of toxic chemicals does present a great risk to the human population and the environment.

12.3.2 Profiling the Vulnerabilities

A. Man-made
Buildings are vulnerable to a hazardous materials spill. The combination of fire, water and chemicals could result in an explosion that is likely to damage both the buildings storing hazardous materials and neighboring buildings. Proper storage and handling of these chemicals is critical in decreasing built environment vulnerability.

B. Natural
Factors contributing to the vulnerability of natural systems are the type of chemical spilled, the physical state of the chemical, the amount released, and the location of the incident. Vulnerability of the natural environment to hazardous materials events is higher for species and ecosystems in the immediate vicinity of the event, and moderate for those located downstream. Over time, non-point source hazards may accumulate and pose a threat to the natural environment; however, the lack of data on non-point source hazards makes it difficult to justify a significant vulnerability.

C. Systems
A hazardous materials spill anywhere along Redmond's transportation network will have an immediate impact on travel time and delays. A flammable material that explodes would cause significant damage to the roads and bridges. Similarly, an explosion could destroy power lines.

Municipal water systems and stormwater drainage systems are vulnerable to a toxic spill. Chemicals that reach the water system could limit the supply of potable water. Toxic spills that enter a stormwater drainage system may feed directly into local rivers and lakes or into the groundwater.

D. Populations

Hazard Specific
Populations in close proximity to a spill will be particularly vulnerable.

Isolated Populations
The City of Redmond is particularly vulnerable to isolation in the event of a hazardous material spill occurring on a major arterial roadway connecting to the greater Puget

Sound region. A spill that closes or destroys part of SR 520 would leave much of Redmond isolated from the surrounding region.

Disabled Persons
Mobility impaired persons would be vulnerable to a spill or vapor release that requires immediate evacuation. Similarly, people with hearing or sight impairments may require special notification if the standard announcements are not available.

Children
Young children with developing respiratory systems are especially vulnerable to a chemical vapors.

Elderly
Elderly with mobility impairments or compromised immune systems may suffer greater injuries in the case of a hazardous material release.

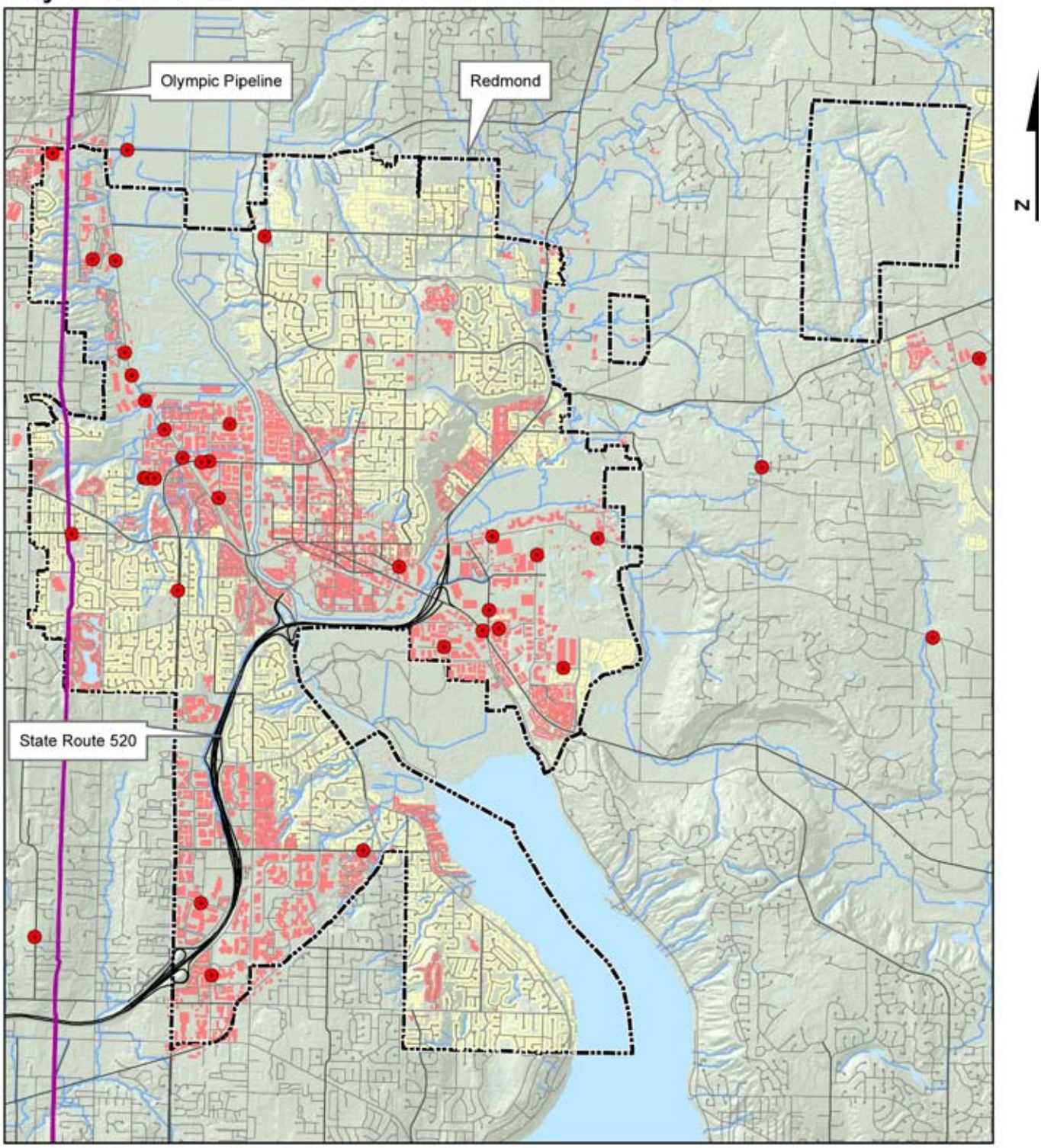
Limited English Language
Limited English speakers may not have immediate information about a spill without translation. Additionally, access to appropriate aid may be complicated by language barriers.

Low-income Residents
Low-income citizens are more likely to reside in closer proximity to hazardous facilities than wealthier counterparts. If displaced by a hazardous materials spill, limited income residents may face additional hardship.

12.3.3 Analyzing Development Trends

A vast majority of existing Tier II facilities are located within industrial and manufacturing areas. The future land use map shows maintenance of similar zoning in areas where the highest concentrations of Tier II facilities are currently located. However, continued automobile dependency may increase the number of gas stations (Tier II facilities) in proximity to residential areas. The addition of wireless telecommunications will increase the number of Tier II facilities near residential areas.

City of Redmond Tier II Hazardous Material Facilities



Sources: State of Washington, King County

Tier II Hazardous Material
Commercial Buildings
Residential Buildings

Approximate Scale in Feet
5,000 2,500 0 5,000

Map 33: City of Redmond Tier II Hazardous Material Facilities

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