

TABLE 4-1
Pipe Condition Grade Descriptions

Grade	Condition	Description	Structural Score Range*
1	Excellent	No defects or few minor defects	0 – 9
2	Good	Minor defects or few moderate defects	10 – 99
3	Fair	Moderate defects that will continue to deteriorate	100 – 999
4	Poor	Moderately severe defects that will become Grade 5 defects in the foreseeable future	1,000 – 9,999
5	Very Poor or Immediate Attention Required	Defects requiring immediate attention. (Failure or failure imminent.)	10,000 +

*Structural scores are automatically calculated by the Hansen Maintenance Management Database based on inspection data.

4.2.2.3 Structural Deficiency Risk

All pipes are at risk of structural failure at some point in time. Pipes in poor condition are at risk to fail in the near future, while pipes in good condition are at risk to fail in the future. In accordance with the asset management approach discussed in Section 2.4, the business risk of a structural failure, for any given pipe, was estimated by calculating the potential cost of consequence of failure, estimating the likelihood of failure, and taking the product of both to develop a risk distribution as a function of time. The process for doing this is outlined below using an example structural failure. The example pipe is 8 inches in diameter, 290 feet long, and located along NE Fremont Street between NE 28th Avenue and NE 29th Avenue.

4.2.2.3.1 Consequence of Failure Valuation

The consequences of a structural failure vary depending on the size, depth, and location of the pipe. For the example pipe, the consequence of failure valuation is shown in Figure 4-2. In this example, it is assumed the structural failure causes the following:

- Sewage to back up into two basements
- Sewage to overflow into the street
- Development of a sinkhole in the street

These consequences and the associated costs listed in Figure 4-2 correspond to those summarized in Table 2-3 of Chapter 2—Asset Management Approach. The average depth of the example pipe is 11 feet; moreover, it is located near a school and on a residential street that serves as an emergency route. These factors affect the valuation of consequence of failure.