SR 99: ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROGRAM

Section 106 Technical Report
Archaeological Resources
S. Holgate Street to S. King Street Viaduct Replacement Project

June 2008

SR 99: ALASKAN WAY VIADUCT MOVING FORWARD PROJECTS

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Archaeological Resources

S. Holgate Street to S. King Street Viaduct Replacement Project

Agreement No. Y-9959

Task AW.02

The SR 99: Alaskan Way Viaduct Moving Forward Projects is a joint effort between the Federal Highway Administration (FHWA), and the Washington State Department of Transportation (WSDOT). To conduct this project, WSDOT contracted with:

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Northwest Archaeological Associates, Inc

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LIST OF EXHIBITS

.

ACRONYMS

A.D.	Anno Domini
AGD	Area of Ground Disturbance
APE	Area of Potential Effects
B.P.	before present
fbs	feet below surface
FHWA	Federal Highway Administration
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
Project	SR 99: S. Holgate Street to S. King Street Viaduct Replacement Project
SHPO	State Historic Preservation Officer
SIG	Seattle International Gateway
SR	State Route
WSDOT	Washington State Department of Transportation

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Chapter 1 Introduction

The Alaskan Way Viaduct and Seawall Replacement Program addresses the deteriorating and seismically vulnerable viaduct and seawall. The Washington State Department of Transportation (WSDOT) is moving forward with early safety and mobility improvements that will replace or repair over half of the seismically vulnerable viaduct, known collectively as the Alaskan Way Viaduct Moving Forward Projects. The SR 99: S. Holgate Street to S. King Street Viaduct Replacement Project (the Project) at the viaduct's south end consists of rebuilding the main State Route (SR) 99 highway corridor and improving access to S. Atlantic Street, S. Royal Brougham Way, and Terminal 46. Construction includes subgrade and surface improvements and relocation of rail facilities.

The Project lies primarily within former deltaic tideflats that were filled in the late nineteenth and early twentieth centuries. The northern terminus occurs near the south edge of "Denny's Island," which was inhabited by Native Americans and subsequently became part of the initial urban core of Seattle. The tideflats included a series of distributary channels of the Duwamish River that would have been attractive to Native Americans for fishing, while other areas may have been used for clamming, hunting waterfowl, or obtaining other plant and animal resources. The area south of S. King Street historically developed with a series of wharves and industries built over the tidal zones. In the 1890s, a scheme to build a ship canal through Beacon Hill and create useable land out of the tideflats began filling the areas east and west of First Avenue S. By 1909, the entire area subject to effects from the Project had been filled and redeveloped into the principal railway corridor and industrial area for the city. Both Native American and historical resources could occur within the vicinity of the Project.

1.1 Project Description

The Project would demolish the SR 99 mainline from S. Walker Street (just south of S. Holgate Street) to the vicinity of S. King Street, and replace it with new elevated structures, ramps, and fill embankments. The new SR 99 in the project area would generally be a side-by-side structure with three travel lanes in each direction, except at the north end where the roadway would transition to a stacked structure to match the existing viaduct. A northbound off-ramp to Alaskan Way S. and a southbound on-ramp from Alaskan Way S. would be provided south of S. King Street. The Project also includes modifications to the Whatcom Railyard tracks and improvements to surface streets (Exhibit 1-1).

From the south end of the Project to about S. Holgate Street, the roadway alignment would be at-grade. It then would rise northward via a retained fill embankment up to an elevated structure, which would span over S. Atlantic Street and railroad crossings to provide grade separation. Deep foundation types for the elevated structure include cast-in-place concrete piles where dense glacially overridden soils are deeper than 120 feet and drilled shafts where these soils are shallower than 120 feet. Cast-in-place concrete piles are closed-end steel pipe piles (casings) driven 150 feet into the ground and filled with reinforced concrete. They would have 2-foot diameters and be driven to an average depth of 150 feet below the surface. Pile sets each would be linked by a pile cap that would have a plan dimension of 30 feet by 50 feet and a height of 5 to 7 feet. The elevated structure would connect to another retained fill embankment just south of S. Royal Brougham Way, where lanes would transition to surface grade. Northbound lanes would continue for about 400 feet, then connect to a retained fill embankment, while southbound lanes would extend at-grade for another 650 feet before rising on a retained fill embankment. These fill embankments would connect to a stacked elevated structure, supported by drilled shaft foundations, that would reconnect SR 99 to the existing viaduct near its intersection with Railroad Way S.

Ground improvements would be required at all new retained fill embankments in the project area, and in a 90-foot-wide strip underlying the new elevated structure south of S. Royal Brougham Way, to offset the risk of soil liquefaction and lateral spreading of soils during a future earthquake. Deep soil mixing or jet grouting would occur as columns in a high-density grid array in a 50-foot-wide strip directly under the new elevated structure, with a 40-foot-wide strip of earthquake drains emplaced directly adjacent to the east. Within S. Atlantic Street, a portion of the 50-foot ground improvement area would intersect utilities and require jet grouting. Stone columns would be placed under embankments.

Grade-separated access would also be provided for freight truck traffic traveling between the BNSF Seattle International Gateway (SIG) Railyard, SR 519 connections, and the Port of Seattle facilities at Terminal 46. These east-west movements would occur via a U-shaped undercrossing extending from the intersection of S. Atlantic Street/Colorado Avenue S. to the intersection of S. Atlantic Street and E. Marginal Way S. Construction of the undercrossing would require secant walls and ground improvements,

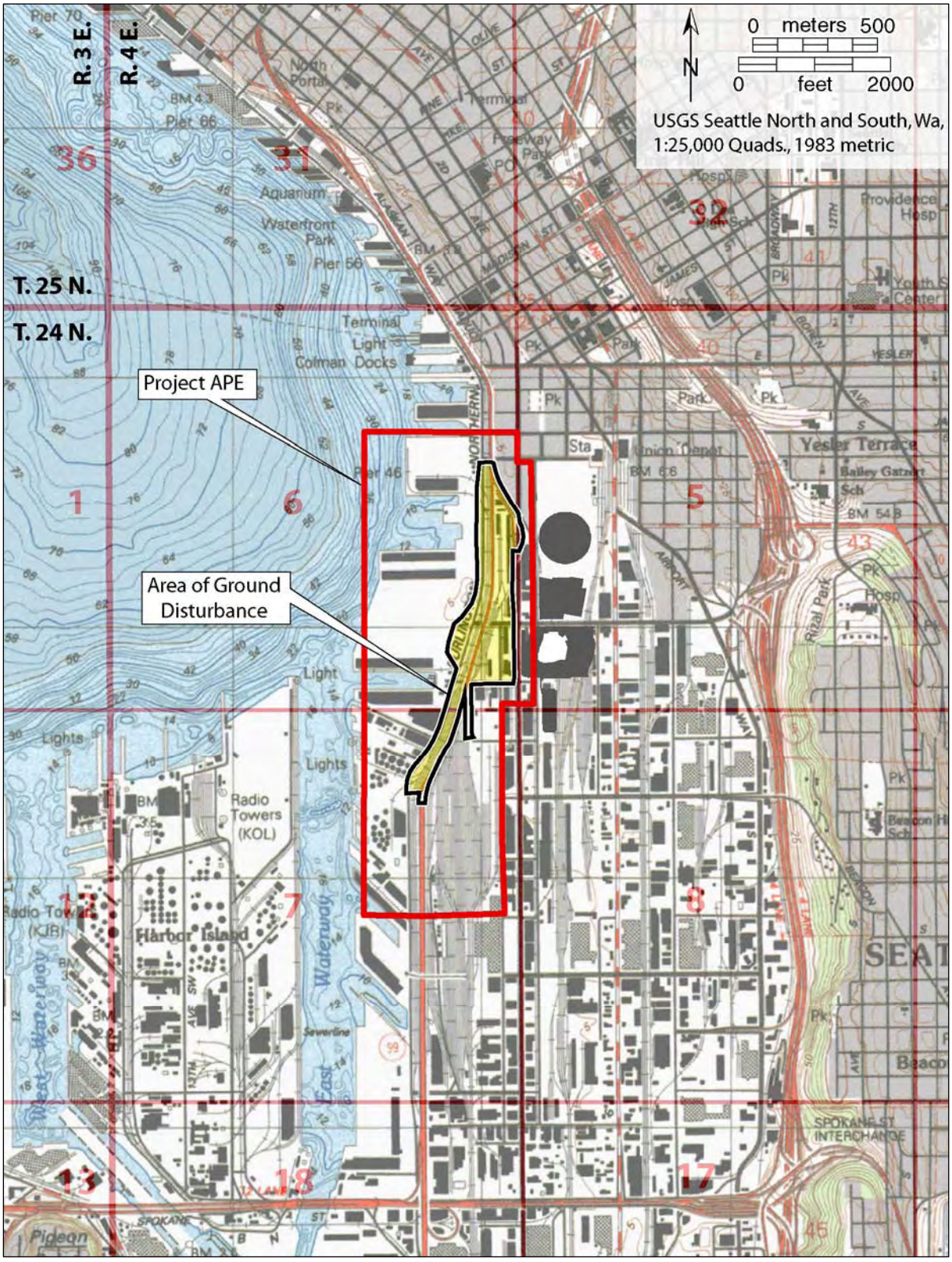

Exhibit 1-1. Area of Potential Effects and Area of Ground Disturbance for the S. Holgate Street to S. King Street Project

including deep soil mixing, jet grouting, earthquake drains, and stone columns or displacement piles.

A remote holding area for Seattle Ferry Terminal traffic would be built between S. Royal Brougham Way and S. King Street. During construction, temporary bridges would accommodate continued travel north of S. King Street. These temporary bridges would be supported by auger-cast piles or micropiles.

1.2 Regulatory Setting

The Project is subject to the National Historic Preservation Act, and therefore, identification of adverse effects to historic properties from this undertaking must be considered. The National Environmental Policy Act (NEPA) has similar goals.

The National Historic Preservation Act of 1966 (NHPA), as amended, requires federal agencies, in this case the Federal Highway Administration (FHWA), to identify and assess the effects of federally assisted undertakings on historic resources, archaeological sites, and traditional cultural properties and to consult with others to find acceptable ways to avoid or mitigate adverse effects. Resources protected under Section 106 of the NHPA are those that are listed in or are eligible for listing in the National Register of Historic Places. Eligible properties generally must be at least 50 years old, possess integrity of physical characteristics, and meet at least one of four criteria of significance. Historic properties may include archaeological sites, buildings, structures, districts, or objects. Regulations implementing Section 106 encourage maximum coordination with the environmental review process required by NEPA and other statutes (36 CFR Part 800.8).

The review process of Section 106 of the NHPA consists of four steps. The first is the *initiation* of the process, which involves determining if the action is an undertaking, determining whether that action has the potential to affect historic properties, and identifying consulting parties. The second step is to *identify* historic properties. To complete this step, the Area of Potential Effects (APE) must be identified, the scope and results of previous identification efforts must be reviewed, and appropriate studies designed to identify and evaluate historic properties must be completed. The third step is to apply the *criteria of adverse effect* to determine if such effects are likely to occur. The fourth step, implemented if historic properties will be adversely affected, is *resolution of adverse effects*, including consideration, through consultation with the State Historic Preservation Officer, Tribal Historic Preservation Officer, concerned tribes, or other consulting parties, of measures to avoid, minimize, or mitigate such effects.

WSDOT, on behalf of the FHWA, initiated consultation with the Washington State Historic Preservation Officer (SHPO), Muckleshoot Indian Tribe, Snoqualmie Indian Tribe, Suquamish Tribe, Tulalip Tribes, and Confederated Tribes and Bands of the Yakama Nation regarding potential adverse effects from the Project. Coordination was also undertaken with other interested parties, including the non-federally recognized Duwamish Tribe.

1.2.1 The APE

The APE is the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist (36 CFR 800.16). The Project APE was developed by WSDOT on behalf of FHWA in consultation with affected tribes and the SHPO.

The APE shown in Exhibit 1-1 was reviewed for above-ground cultural resources, a process that is reported separately (Sheridan 2008). A second area was defined within the APE based on the potential to damage subsurface archaeological properties. The limits of this area, called the Area of Ground Disturbances (AGD), have defined the study area for this assessment. The AGD includes proposed locations for utility relocation; railroad track construction and modification; soil improvements; and column and foundation supports, ramps, and road construction (Exhibit 1-2). In addition to its horizontal extent, the maximum vertical extent of the AGD is 150 feet (46 meters).

1.2.2 Identification Efforts

Archaeological investigations using traditional methods have been prevented by a number of factors. Construction of the viaduct in the 1950s extensively disturbed upper deposits in the AGD, so methods were needed to explore relatively deeply. Unfortunately, the viaduct itself is an obstacle to deep excavations because disturbance in its vicinity could compromise structural stability. High water table and potential presence of hazardous materials in the densely developed corridor further restricts the ability to conduct subsurface exploration by traditional means. Some excavations like these will have to occur in coordination with construction. These investigations will be conducted under the terms of a Memorandum of Agreement developed for the Project under 36 CFR 800.

Exhibit 1-2. S. Holgate Street to S. King Street Proposed Action

In spite of these difficulties, several studies have been undertaken to identify historic properties within the AGD and are the basis for the present report. These studies include research designs prepared for pre-contact and historic archaeological properties and collection of geotechnical cores. Reports prepared for these studies present background data, summarize current information available from other cultural resources studies, develop models and analytic methods, and identify themes and contexts useful for historic property evaluation (Northwest Archaeological Associates and Company 2006a, b).

Continuous rotasonic cores were collected within the AGD in 2007 as part of preliminary studies for the Alaskan Way Viaduct and Seawall Replacement Project prior to the full development of the present Project (Miss et al. 2008a). At that time, standard methods of recording and analysis were established. Additional cores were collected and documented using the same procedures in early 2008 for the Project in portions of the AGD not previously investigated. These latter cores have been only partially reported (Miss et al. 2008b and Attachments A and B here); however, the results of this investigation and the earlier core program are used in this report. The data are presented in the body of this report in synthesized form to support conclusions and recommendations. Basic data from these excavations can be reviewed in Attachments A and B.

Three other sources of information contribute to this analysis: the archaeological assessments completed for the proposed relocation of electrical utilities in the Project vicinity by the City of Seattle (Alaskan Way Viaduct & Seawall Replacement Program 2007) and for proposed changes to SR 519; and the results of core collection and archaeological monitoring at Bents 93 and 94 on the viaduct (Hodges and Boswell 2007; NWAA 2008 in preparation). Each of these projects has contributed new insight to interpretation of the tideflat setting.

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Chapter 2 Affected Environment

Archaeological evidence indicates that human occupation of the Pacific Northwest began soon after the retreat of continental glaciation at the end of the Pleistocene, the last ice age (Carlson and Bona 1996; Carlson 1990). Changing environmental conditions related to these climate and geophysical forces have in turn affected the kinds and distributions of resources available to people, as well as the suitability of particular landforms for occupation. Environmental changes have also had consequences for the archaeological record regarding site visibility and preservation. The natural setting of the project area, therefore, shapes assumptions for archaeological remains that may be found within the AGD.

A detailed discussion of the natural and cultural settings can be found in the Phase 1 Coring Program report and the Research Designs for Native American and Historic Archaeological Properties (Miss et al. 2008a; Northwest Archaeological Associates and Company 2006a, b).

2.1 Natural Environment

The project is south of downtown Seattle in Elliott Bay on a large expanse of level land artificially elevated 10 to 15 feet (3.0 to 4.6 meters) above sea level. Located in the eastern portion of central Puget Sound, Elliott Bay extends south from Smith Cove, north of the downtown business district, to the mouth of the Duwamish River. Local topographic features, such as Elliott Bay, Duwamish Bluff to the west, and Beacon Hill to the east, are a legacy from multiple ice sheets that advanced south from southwestern British Columbia during the Pleistocene (1.8 million to 10,000 years ago). As these ice sheets advanced and retreated, they left behind the distinctive ridge and trough topography characteristic of the Puget Sound region today. During the last glacial advance, which began about 17,000 years ago and is known as the Vashon Stade of the Fraser glaciation, Seattle was covered by as much as 1,500 feet of ice (Dethier et al. 1995).

As the ice began to retreat northward again beginning about 15,000 years ago, numerous freshwater lakes were dammed behind the ice front. These lakes occupied the glacially scoured troughs. Over time, they formed increasingly larger lakes at progressively lower elevations until the ice reached the eastern end of the Strait of Juan de Fuca and the connection to the sea was established. Deposits and landforms associated with this period include glacial outwash composed of sediments shed from the retreating glacier and reworked by meltwater streams, fine-grained sediments (silt and clay) deposited at the bottom of the lakes, fan deltas formed at different elevations around the Puget

Sound basin by meltwater streams, meltwater channels and outlet spillways that connected the lakes at various elevations, and a small number of ephemeral lakeshore features (Thorson 1989).

Land formerly depressed under the weight of the ice experienced isostatic rebound as the glacier retreated northward. In northern Puget Sound where the ice sheet was thicker, the rebound was much greater and land was lifted upwards from 197 to 262 feet (60.0 to 79.9 meters), but in the central and southern Puget Sound where the ice was much thinner, uplift was considerably less. Uplift from rebound was completed by 9,000 years ago and global sea-level rise began to drown the early Holocene shorelines (Dragovich et al. 1994). Elliott Bay did not exist at this time, and there were no tideflats in the project area. Rather, marshes fringed the newly exposed Denny Island and the foot slopes surrounding the bay. The deep glacial trough of the Duwamish River valley at this time was a marine embayment that extended southward to the vicinity of the town of Auburn.

About 5,700 years ago, the collapse of a portion of Mount Rainier created a huge debris avalanche and mudflow (called a lahar), known as the Osceola Mudflow. The lahar coursed down the White River, spilling into the Green and Puyallup drainages (Dragovich et al. 1994; Mullineaux 1970). This caused the course of the Duwamish River to change, and between 1,520 and 2,120 calendar years Before Present (B.P.) the Duwamish River began emptying into Elliott Bay (Zehfuss et al. 2003).

A large prehistoric earthquake at the Seattle Fault Zone (just south of the APE) occurred between 1,050 and 1,020 calendar years B.P. (Anno Domini [A.D.] 900 to 930). The earthquake raised Alki Point at the southern entrance to Elliott Bay more than 13 feet (about 4 meters) and lowered the West Point cuspate spit at the north end of Elliott Bay approximately 3 feet (1 meter) (Atwater and Moore 1992; Bucknam et al. 1992). Recent research suggests that uplift from the A.D. 900 earthquake raised the river bed at the mouth of the Duwamish River and created a distinct single valley-floor terrace above the level of historical flooding in the lower reach of the river (Collins and Sheikh 2005; Updegrave 2007). Although the uplift caused shifts in local habitats at the river mouth, ongoing delta advance due to increased sediment load upstream moved the river mouth into southern Elliott Bay. By the time European Americans (Euroamericans) arrived at the bay in the 1850s, the APE was part of a large 1,400-acre (5.7 square kilometer) tideflat that filled the southeastern portion of the bay at the mouth of the Duwamish River. Early maps depict several large delta distributary channels and islands along the east margin of the bay where the river entered (Exhibit 2-1). These islands, or inter-channel areas, sat just above mean high tide and were covered with salt-

tolerant sedges, grasses, and rushes (Kruckeberg 1991). Later nineteenth-century small-scale navigation charts of Elliott Bay suggest that the surface of the tideflats north of these islands was drained by a tidal channel network.

2.2 Cultural Setting

The early human history of Elliott Bay and the surrounding area is related to the landscape and the availability of resources. Native American communities, whose descendants are now members of the Suquamish Tribe, the Muckleshoot Tribe, the Snoqualmie Tribe, the Tulalip Tribes, and the non-federally recognized Duwamish Tribe, occupied the vicinity for millennia. The Yakama Nation also claims this area as a location for resource procurement and trade. Euroamerican history of the area is related to the deep port, abundant timber and coal, and the development of transportation systems and markets which attracted growth.

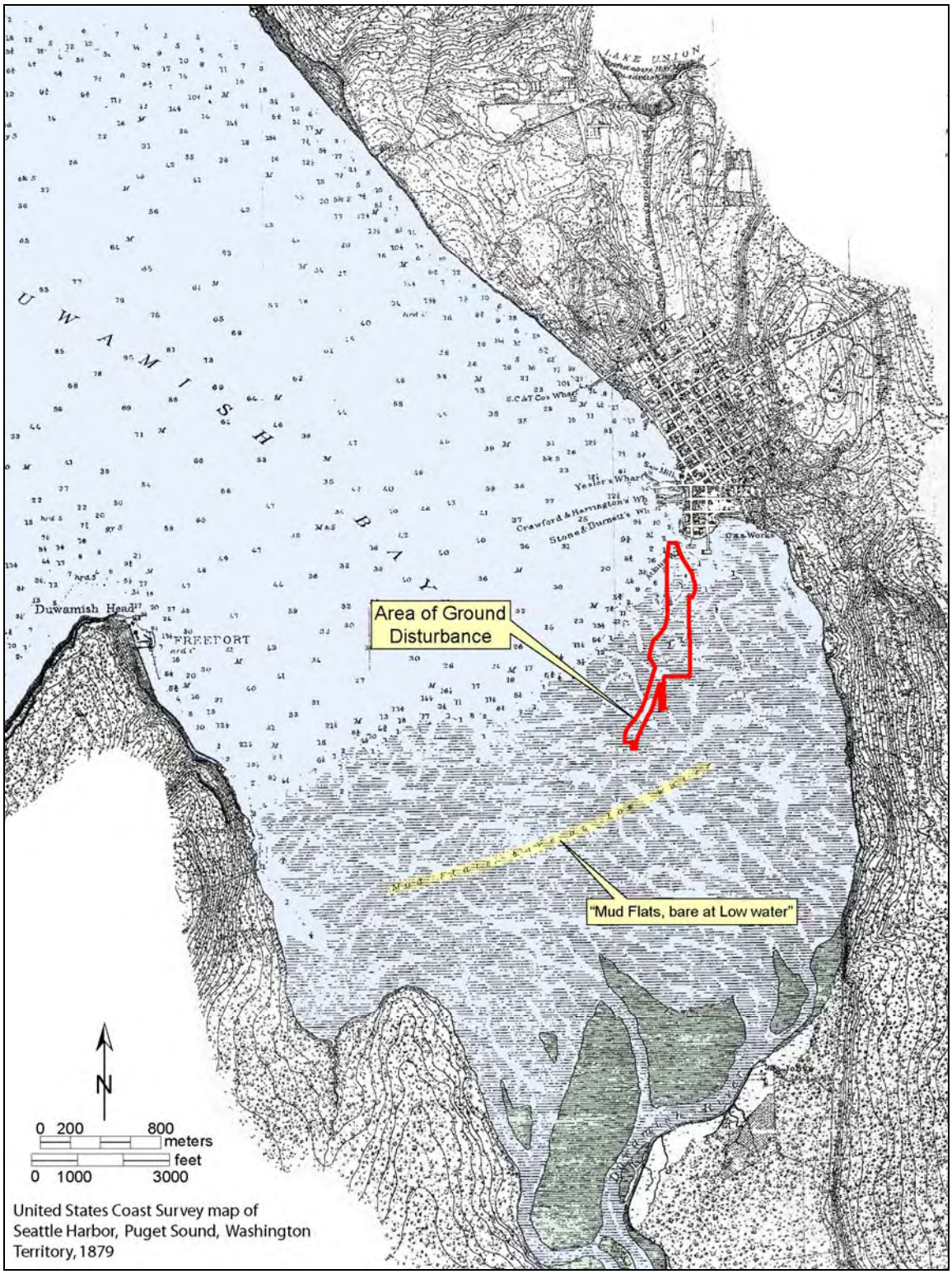

Exhibit 2-1. Early Map of Elliott Bay Showing the S. Holgate Street to S. King Street Project AGD on the Tideflats of the Duwamish River Delta, 1879

2.2.1 The Pre-Contact Period

The earliest settlement of western Washington occurred at least 11,000 years ago based on finds of extinct mammals such as the Manis Mastodon near Sequim, and scattered finds of artifacts thought to be of similar antiquity called "fluted" points. The closest discovery of these artifacts to the APE is associated with an ancient peat bog near Maple Valley, about 25 miles southwest of Seattle. Pre-contact period sites from around the Pacific Northwest suggest continuous habitation throughout the ensuing 11,000 years (Ames and Maschner 1999; Matson and Coupland 1995). In the Puget Sound region, assemblages of stone tools called "Olcott," that cannot be dated by any current means, have been found on the edges of terraces more often away from the saltwater shoreline, a position that suggests siting for expansive views as might benefit hunters. Such locations may also have been chosen to avoid the unstable bottoms and slopes of valleys whose rivers carried remnants of glacial meltwater and to avoid marine shorelines responding to rising and falling sea levels as the land bounced back after being depressed by the weight of glacial ice. Early shorelines themselves were inundated by about 5,000 years ago by rising sea levels that have accompanied continued post-glacial warming, making evidence of marine-oriented settlement before this time difficult to acquire.

Sites dating after about 5,000 years ago are more common in the region. More recent archaeological evidence in the Puget Sound region documents significant changes in technology, subsistence, and settlement patterns over the past several thousand years. During this period, population increased and groups began to organize themselves in more complex ways. The subsistence base included a broad spectrum of locally available resources. The period between 3,000 B.P. and 1,000 B.P. saw the emergence of a semi-sedentary settlement pattern based on the central village with specialized seasonal camps. There was increasingly sophisticated use of storage technology and emergence of ranked societies. The final 1,000 years of coast prehistory are characterized by permanent houses in central villages, a salmon-based economy, and ascribed social status (Matson and Coupland 1995; Morgan 1999).

No pre-contact properties are recorded within the APE.

2.2.2 Ethnography

The APE is in traditional territory of the Duwamish, a Lushootseed-speaking group that lived in villages on the shores of Elliott Bay, Lake Washington, Lake Union, Salmon Bay, and on the banks of the Duwamish, Black, and Cedar Rivers. Prior to the mid-nineteenth century, both permanent Indian

settlements and temporary camps were scattered along the shoreline of Elliott Bay. Today many Duwamish descendants have chosen to become members of federally recognized tribes, including the Muckleshoot Tribe, Snoqualmie Tribe, Suquamish Tribe, and Tulalip Tribes. Others continue to strive for federal recognition.

Like many other Puget Sound groups, the Duwamish traditionally followed a seasonal round that was tied to available resources. The region is one of mild climate and abundant resources, and usually enough salmon could be harvested in a few weeks to last the winter. In spring and summer, people dispersed from winter villages of cedar plank houses to live in temporary camps to fish; hunt land and sea mammals; and collect roots, berries, and other plants. In winter, preserved forms of these foods supported the village while important ceremonial work was completed. Winter was also important for establishing and maintaining social relationships. Heads of households hosted public events marking changes in status like naming, puberty, marriage, or death. The events also demonstrated the households' social stature. The more important the family, the more guests were welcomed, representing ties of marriage, adoption, trade, and social obligation (Miller 1999:20-21).

No recorded ethnographic sites are known within the APE. One named ethnographic location, *Djidjdkila'lltc*—the crossing over place, a promontory topped by a few trees with a lagoon behind it, is on Denny Island north of the project. A village was located on each side of the Denny Island promontory (Waterman 2001).

2.2.3 Ethnohistory

A second set of locations comes from historic accounts of Native American presence in Seattle. When the Denny Party landed at Alki they were joined almost immediately by several hundred people who either regularly camped or lived in the vicinity. The newcomers attracted attention because of their novelty and the safety their guns provided from other marauding Indians. After the establishment of Yesler's Mill in 1853, Native Americans were an important labor source for Yesler and other early businessmen. Indians also continued to hunt, fish, and gather and provided food for the early growing community. Separate Indian encampments or enclaves continued through the 1870s, despite the establishment of reservations in the years after the treaty signed at Point Elliott. In the 1880s temporary encampments of families headed to work in the hops fields on the tideflats south of Jackson Street. These camps included Alaska Natives and members of distant tribes as well as local people. By the twentieth century, separate Native American enclaves or communities within the bounds of the city had vanished.

No recorded ethnohistoric properties are known in the APE. Two ethnohistoric locations known from historical references are within the APE; two others are adjacent (Exhibits 2-2 and 2-3).

[Exhibit 2-2 redacted]

[Exhibit 2-3 redacted]

2.2.4 History

The project traverses some of the oldest industrial development in the city, as well as some of the youngest. The earliest settlement of Seattle focused on Denny Island, north of the AGD. David S. "Doc" Maynard filed a land claim on the Island and started a salmon packing enterprise on the shore in 1853. At the same time, Henry Yesler established his lumber mill and began building his wharf on the west side of the Island. The history of development south of Denny Island was dependent on wharf construction and tideland filling. One of the earliest businesses in Seattle was the Stetson and Post Mill, which relocated from its original site on Yesler's Wharf in the 1860s onto a dock in the tideflats in 1876. Other industries developed soon after, each requiring wharves, docks, piers, and trestles to stand above high tide. Low-income residents also took advantage of the tideflats with the use of floating shanties and tenements and hotels located on wharves. Finally, the tidelands were home to the burgeoning railroad industry, with rail trestles running throughout the area, concentrated on the waterfront along Railroad Avenue.

Detailed fire insurance maps were first prepared in 1884 and clearly document the pace and location of the city's growth over the tideflats (Northwest Archaeological Associates and Company 2006a, b; Sanborn Map and Publishing Company 1884, 1888, 1904, 1916, 1950). As shown in Exhibit 2-4, development was fairly rapid between S. King Street and S. Royal Brougham Way beginning in the 1870s. By 1894 the area began to undergo filling using dredge materials from the southern canal project, and by 1904 the AGD was a dense network of small and large businesses, scattered low-income housing, and made land. By 1916, the Stetson and Post Company's wharf was gone. Railroad Avenue remained active, as was the Pacific Coast Company, whose coal bunkers occupied the western edge of the project area. Small residences and hotels were scattered throughout the eastern edge of the area.

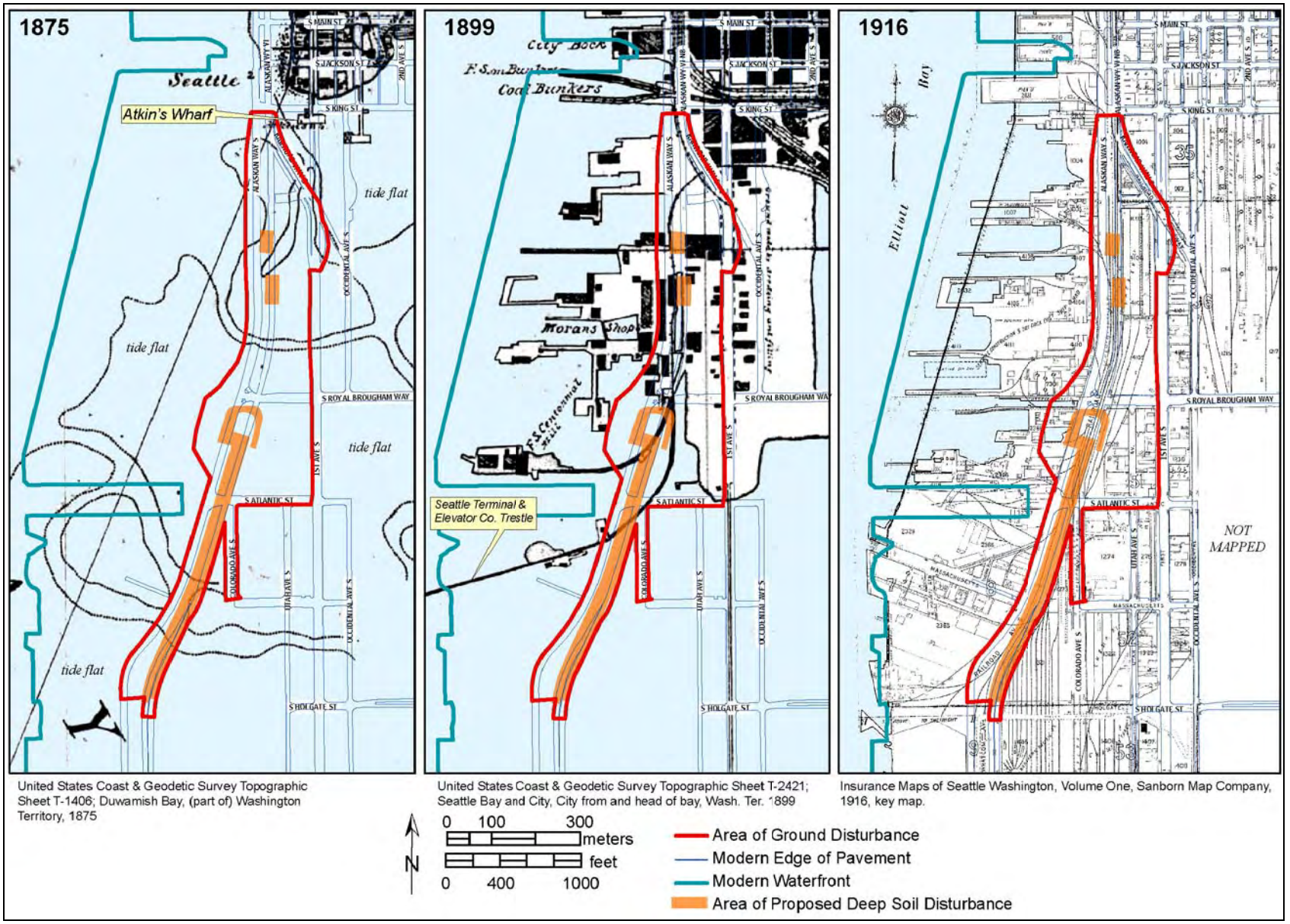

Exhibit 2-4. Maps Illustrating Historical Changes from Land Filling and Industrial Development in the S. Holgate Street to S. King Street Project APE, 1875 to 1916

Manufacturing declined over the years, and by 1950 the largest businesses in the APE were the Pacific Coast Company and the Union Pacific Railroad facilities. The U.S. Government gained control of the former site of the Moran Brothers Shipyards, which was occupied in the 1930s by Seattle's largest Hooverville.

Historical development was absent south of S. Atlantic Street and very limited south of S. Royal Brougham Way until after 1900. Some of the first developments in those areas were the Seattle Terminal and Elevator Company railroad trestle built across the tideflats to West Seattle in 1890, and the first filling of the tideflats using dredge spoils from the Seattle and Lake Washington Waterway project in 1894. By 1916 most of this same area, particularly the Alaskan Way/Railroad Avenue alignment, consisted of railroad tracks. The combination of late development and rapid filling of this area suggests moderate to low potential for historic properties to be encountered by construction of the Project. No recorded historic-period properties are known within the APE.

2.3 Previous Archaeological Investigations

Cultural resources studies related to modern developments in the tideflats area have long recognized the potential for discovery of pre-contact and historical archaeological remains. Two studies intersect the project area, each completed for the SR 99: Alaskan Way Viaduct & Seawall Replacement Program, neither of which identified properties eligible for the National Register of Historic Places.

In 2004 archaeologists predicted that subsurface construction could result in the disturbance of intentional fill in the tideflats dating to the turn of the century, including buried wharves, coal bunkers, railroad facilities, and structural remnants of early industries. Also disturbed would be evidence of the Great Seattle Fire of 1889, which has its southern boundary near S. King Street. Regarding pre-contact and ethnohistoric resources, the potential for evidence of pre-contact occupation on the tideflats was judged highest near S. King Street and was expected to consist of objects such as wood stakes, matting, basketry, or rock alignments representing fish harvesting on the tideflats. Potential for concentrations of shell and/or rock were judged highest close to *Djidjdkila=lltc,* north of the AGD on Denny Island. Other pre-contact materials and features that might be present include hearths and rock pavements, debris from tool manufacture, and stone and bone tools (Larson Anthropological Archaeological Services Ltd. 2004).

Gillis et al. (2005) reported the results of geotechnical borehole monitoring at 60 locations along the Alaskan Way Viaduct and Seawall Replacement

Program corridor. Three types of deposits were expected to contain cultural material: historic fill deposits, beach deposits along the present and former shoreline of Elliott Bay and the Duwamish River mouth, and estuary deposits (Gillis et al. 2005). Four locations intersected by the APE were identified using data from the bores as containing either historic-period or pre-contact materials. Abundant shell encountered between S. King and S. Dearborn Streets and at the intersection of S. Royal Brougham Way and Alaskan Way S. was interpreted as possibly representing pre-contact archaeological deposits. Historic-period debris was also found between S. King and S. Dearborn Streets and overlaying the shell-bearing deposits at the intersection of S. King Street and Alaskan Way S. Historic materials included woody debris (sawdust and solid wood fragments), glass, concrete, coal, cinders, brick, and iron oxide staining.

2.4 Recent Archaeological Investigations

Archaeological study of the AGD in the summer of 2007 and early 2008 included the recording and sampling of 50 boreholes between S. Atlantic Street and S. King Street (Exhibit 2-5). Bore locations were selected based on proposed areas of subsurface disturbance for road support columns, the U-shaped undercrossing, and those areas that would be affected by construction. The boreholes yielded continuous cores from depths of 29 to 52 feet below the ground surface (fbs) (8.8 to 15.8 meters), for a total of 1,817.7 drilled linear feet (554 meters). Of that, 878 cubic feet (24.8 cubic meters) were processed for archaeological study (62 percent); the remainder represents unprocessed sawdust, lumber, wood, coal, cinders, dense clayey silt, and deep Holocene and Pleistocene sediments. Methodology for core documentation and processing is described in Attachment A, along with graphical representation of each core.

2.4.1 Stratigraphic Assemblages

Three well-defined stratigraphic assemblages, designated from bottom to top as Pleistocene, Holocene, and Historic Fill, were present in the study area. The Pleistocene sediments pre-date the arrival of humans in the region. Holocene deposits were present at the base of all but four of the cores (AH-42, IB-230, IB-234, and IB-235). The upper contact of the Holocene deposits is relatively level, trending slightly upward and thinning as Denny Island is approached, probably representing topographic relief at the tideflat surface due to the influence of tidal channels. These sediments are representative of three environments of deposition: delta (loosely consolidated sand with finely fragmented shell, plant fibers, and small woody debris), foreshore (gravelly sand with scattered pebbles from a reworked glacial sediment), and estuary

(massive and loosely consolidated silt with variable concentrations of sand or clay).

Between S. Holgate and S. King Streets, the depth of the historic fill ranges from 20 to 45 fbs, where it overlies the intact Holocene deposits. The historic fill includes a variety of artifacts. The wood, sawdust, and lumber which are most common in the northern portion of the APE are associated with early filling of the tideflats, while cinders and coal near S. Royal Brougham Way exist where the coal bunkers used to be (Exhibit 2-6). Brick pavers were encountered at about 5 fbs in both AH-39 and AH-41, suggesting a buried street surface. Correlations among deposits within the historic fill and artifact distribution indicate that boundaries between deposits are the most likely places to find stable surfaces.

Historic sedimentary fill was deposited primarily during landmaking and consists of gravel, sand, and silt. Sand (ranging between 1 and 32.5 feet thick [0.3 to 9.9 meters]), is in all of the cores from S. King to S. Holgate Streets except AH-16 through AH-20, AH-33, AH-38, and AH-40 (cores which contained mostly wood, sawdust, and lumber). North of S. Royal Brougham Way, sand is interbedded with archaeological deposits such as wood, sawdust, lumber, coal, and modern undifferentiated fill, while south of S. Royal Brougham Way, massive sand deposits are beneath silt. A noticeably high volume of silt occurs in cores IB-230 through IB-233 and in AH-01 through AH-04. Although the composition of the silt is not homogenous, the heterogeneity of the facies is consistent from core to core (see Exhibit 2-6).

Other more recent fill, deposited on top of the sand and silt, was vactored to depths up to 7.5 fbs. This undifferentiated historic fill consists of modern and recent historical deposits from filling on top of the railroads and the construction of the Alaskan Way Viaduct.

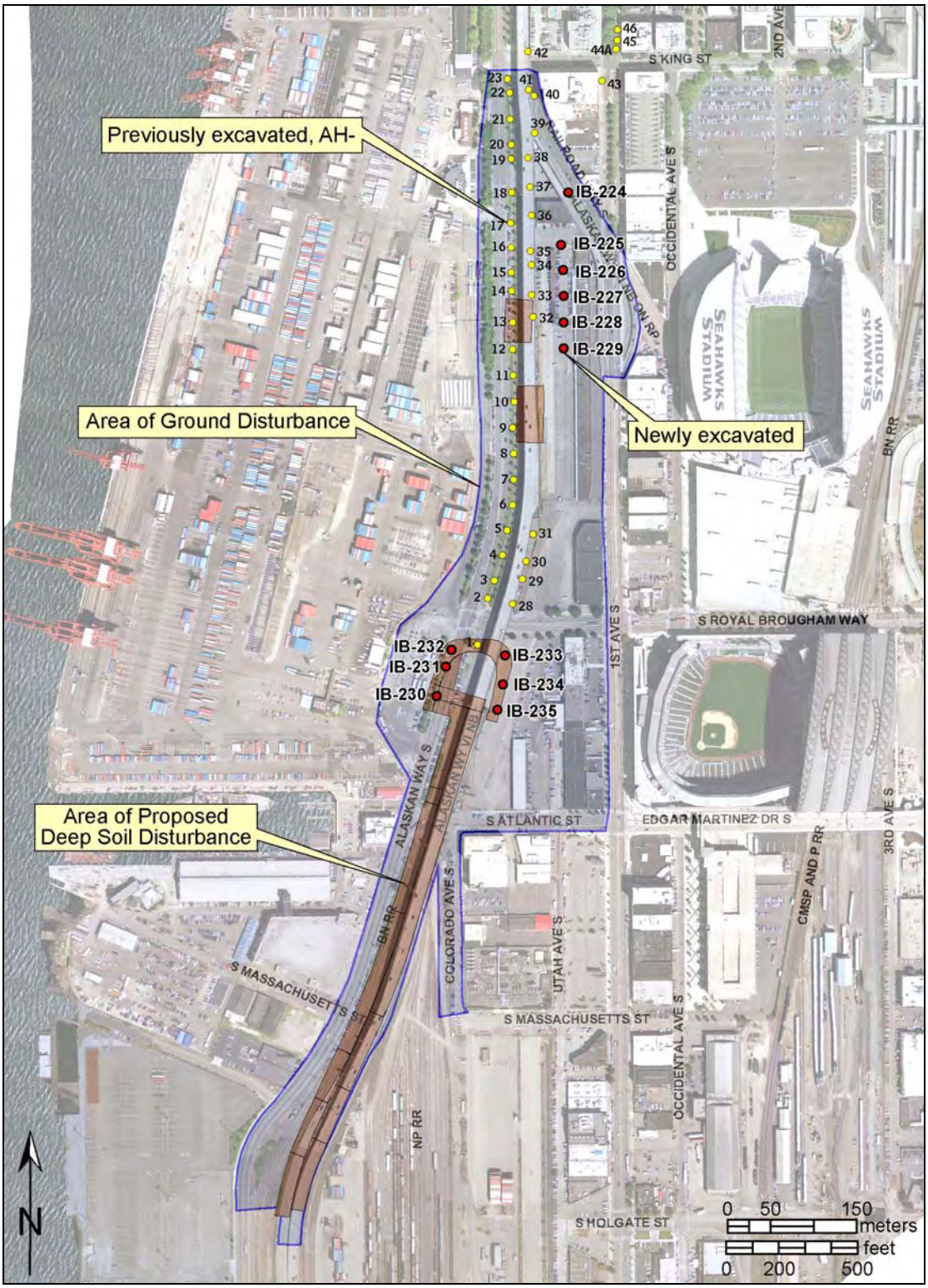

Exhibit 2-5. S. Holgate Street to S. King Street Area of Ground Disturbance with Core Locations

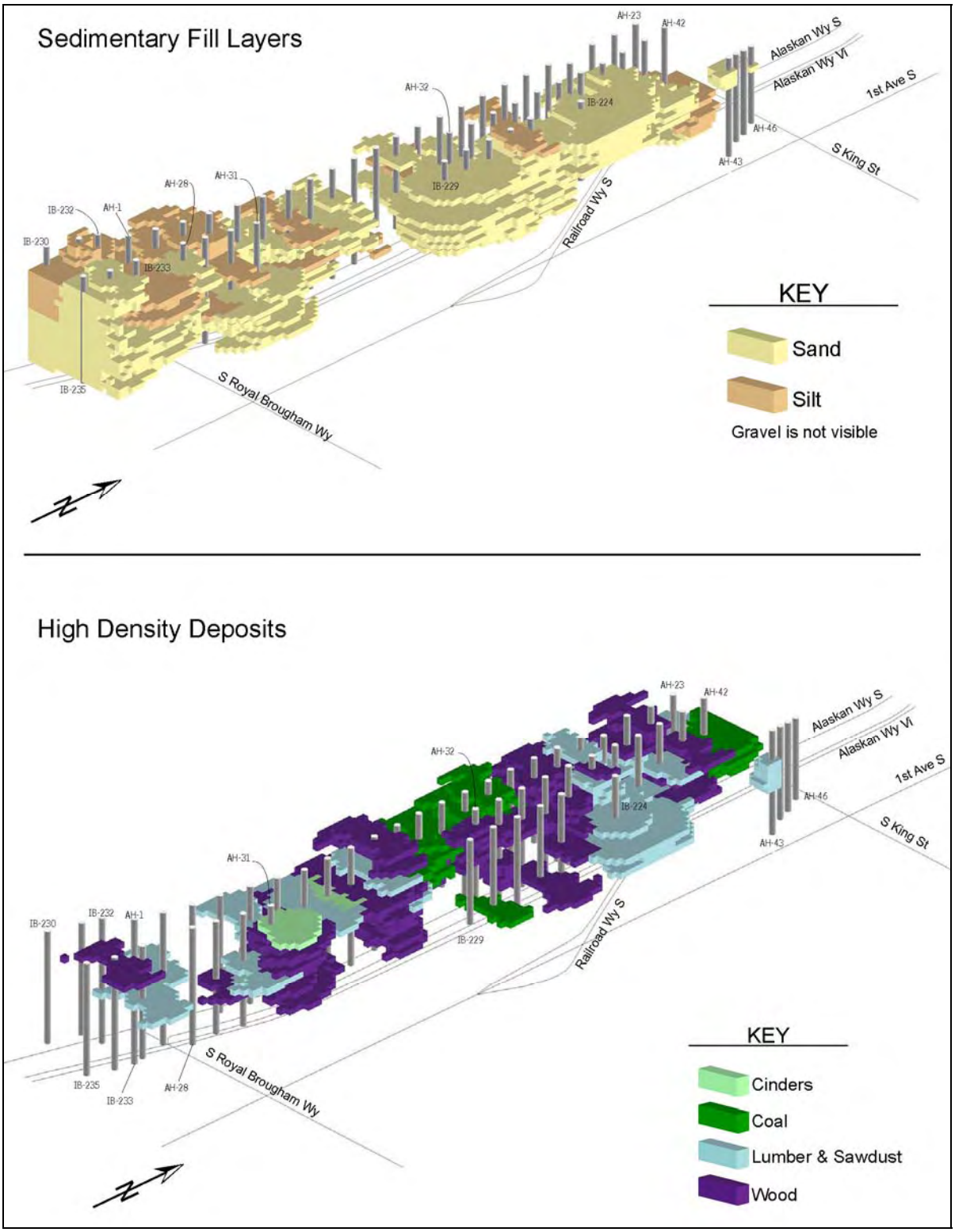

Exhibit 2-6. Distribution of Sedimentary Fill and High Density Facies from the S. Holgate Street to S. King Street Project

2.4.2 Artifact Assemblage

Artifacts recovered from the 2007 and 2008 coring programs yielded a total recovery of 319.4 pounds (144.9 kilograms) of materials, including 5,502 counted artifacts (shell, brick, and coal were not counted). Materials recovered from the Holocene facies included detrital wood and natural shell. Because these materials were in native sediments and not archaeological deposits, they will not be further discussed in this report. The complete artifact catalog can be found in Attachment B.

All archaeological materials were classified according to material type: *Botanical, Faunal, Ceramic, Glass, Metal, Milled Wood*, *Petrochemicals*, and *Other*. Eight of the classes included archaeological materials that were discrete objects (Exhibit 2-7). Discrete artifacts classified as *Botanical* include fruit pits, seeds, and nut shells. *Faunal* specimens include bird, fish, and mammal bone. *Ceramics* include dishes, cups, and other tablewares, terra cotta pipe, concrete, and brick. The *Glass* required no subdivisions. *Metal* includes nails and other metallic items (such as clothing closures and tin cans). *Petrochemicals* consist of coal, charcoal, and clinkers, and materials in the *Other* category include items such as rubber, slag, and plastic. Artifact descriptions are provided in Attachment B.

Exhibit 2-7. Quantities of Discrete Archaeological Materials by Sample Volume

Material	Sample Vol. (ft^3)	# of Artifacts per Sample	Average # of Artifacts per ft^3
BOTANICAL	9.6	157	16.4
CERAMIC			
Concrete	1.00	41	41
Terra cotta	0.33	1	3.03
Tableware	6.06	38	6.27
Subtotal	7.39	80	10.82
FAUNAL			
Bird	2.97	18	6.06
Fish	2.55	20	7.84
Mammal	13.68	140	10.23
Subtotal	19.2	178	9.27
GLASS	42.2	654	15.49
LEATHER	2.52	27	10.71
METAL			
Nails	5.94	20	3.37
Other	10.65	94	8.82
Subtotal	16.59	114	97.41
OTHER	14.32	310	21.64
TOTAL	111.82	1520	13.59

Sprague (1981) created an artifact classification system that attempts to derive cultural meaning from artifact assemblages by placing artifacts into functional categories. The classification sometimes results in artifacts of the same material being placed in different functional categories. For example, a ceramic artifact can be placed into the Domestic category if it is a dish or crock, while other ceramics such as terra cotta are placed in the Group Services category because of their use as sewer pipe. Sprague's classifications also assume that the items were used for their intended function and do not account for repurposing (such as slag, which was originally an industrial by-product reused for housing insulation, or a small bowl being used to hold keys instead of food).

The application of Sprague's taxonomy to the assemblage resulted in the identification of six categories: Architecture (ARC), Commerce and Industry (COM), Domestic Items (DOM), Group Services (GRP), Unknown (UNK), and Personal Items (PER) (Exhibit 2-8). Several sub-categories were derived. The artifacts classified into the remaining Sprague categories are small constituents of the assemblage compared to the Architecture items, yet they demonstrate the diversity of materials and generally excellent quality of preservation.

As shown in Exhibit 2-8, the most diverse class is domestic items. In contrast, little variety occurs within the industrial materials, perhaps because the cores were placed within areas that were railroad alignments adjacent to historic industries. The result was the collection of debris scattered throughout the tideflats and used for fill. Some materials may also have been reused, particularly nails. Manufacturing items such as metallic scrap or bar stock were likely kept until there was no use for them, resulting in a lack of metal debris but high quantities of milled wood that could not be used further.

The distribution of functional categories reveals a concentration of personal materials in the southern and eastern portion of the cores. This was the location of floating shanties, where residents probably discarded their debris directly into the water. At higher elevations farther north, domestic debris appears to be a constituent of the later spoil used for land making, having been deposited in a secondary context as the spoil was brought from its original locations through the city.

Exhibit 2-8. Artifact Assemblage by Functional Class and Sub-class (designated by presence/absence)

MAT	FORM/OBJECT	ARCHITEC-TURAL	COMMERCE/ INDUSTRY	DOMESTIC	PERSONAL			GROUP SERVICES		UN-KNOWN
		Construction	Manufacturing	Household	Clothing/ Accessories	Foot-wear	Other	Utilities	Rec-reation	Other
BOT	Fruit pits, seeds, nut shells	-	-	-	-	-	-	-	-	+
CER	Brick	+	-	-	-	-	-	-	-	-
	Tablewares	-	-	+	-	-	-	-	-	-
	Concrete	+	-	-	-	-	-	-	-	-
	Figurine	-	-	+	-	-	-	-	-	-
	Mortar	+	-	-	-	-	-	-	-	-
	Terra cotta	-	-	-	-	-	-	+	-	-
FAU	Bird	-	-	+	-	-	-	-	-	-
	Fish	-	-	+	-	-	-	-	-	-
	Mammal	-	-	+	-	-	-	-	-	-
GLS	Bottle shards	-	-	+	-	-	-	-	-	-
	Button	-	-	-	+	-	-	-	-	-
	Chimney glass	-	-	+	-	-	-	-	-	-
	Flat glass	+	-	-	-	-	-	-	-	-
LEA	Foot-wear	-	-	-	-	+	-	-	-	-
MTL	Brass	-	-	-	+	-	-	-	-	-
	Tin can	-	-	+	-	-	-	-	-	-
	Clothing closure	-	-	-	+	-	-	-	-	-
	Foil	-	-	+	-	-	-	-	-	-
	Straight pin	-	-	-	+	-	-	-	-	-
	Nails	+	-	-	-	-	-	-	-	-
	Other	-	+	-	-	-	+	-	-	+
	Scrap	-	-	-	-	-	-	-	-	+
	RR spike	-	-	-	-	-	-	+	-	-
	Wire	-	-	-	-	-	-	-	-	+
OTH	Battery core	-	-	-	-	-	-	-	-	+
	Chop-stick	-	-	+	-	-	-	-	-	-
	Graphite	-	-	-	-	-	-	-	-	+
	Hair/fur	-	-	-	-	-	-	-	-	+
	Plastic	-	-	-	-	-	-	-	-	+
	Rubber	-	-	-	-	-	-	-	-	+
	String	-	-	-	+	-	-	-	-	-
	Textile	-	-	-	-	-	-	-	-	+
	Other	-	+	-	-	-	-	-	-	+

Temporal Markers

Artifacts provide temporal information from their dates of manufacture. Trademarks on ceramic and glass fragments led to primarily late nineteenth to early twentieth century dates. Manufacturing techniques and characteristics, like glass color, also provide general ages (Exhibit 2-9).

Exhibit 2-9. Datable Artifacts Recovered from the 2007 and 2008 Coring Programs

No.	Bore No.	Specimen No.	Count	Zone	Comments	Date
1	IB234	5	1	2	Thin, solarized glass, possible lamp chimney	1876–1914
2	IB233	12	1	2	Gun cartridge, "UMC/32 S&W" unfired	>1878
3	IB233	9	12	2	Brown automatic-machine bottle glass.	>1903
4	AH01	2	37	2	Flat panel glass prescription bottle	1875–1910
5	AH28	29	7	1	Includes 6 fragments of a porcelain saucer; polychrome brown and green; decalcomania floral motif	1890s–1920s
6	AH28	25	3	1	Brown automatic-machine bottle glass base.	>1903
6	AH28	24	18	1	Includes 5 fragments of a flask made with an automatic-machine	>1903
7	AH28	22	8	2	Includes 6 fragments of hand painted-on-glaze porcelain vessel; red and black/brown motif	>1890
8	AH28	8	7	2	Includes 6 fragments of brown glass cup bottom mold	1870–1900
9	AH28	12	1	2	Earthenware ceramic with unidentifiable design	1880–1910
10	AH05	6	5	2	Foil from a preserves bottle	>1892
11	AH05	12	5	2	2 pieces of 2-piece mold bottle and 3 pcs of turn/paste mold bottle	1870–1900
12	AH05	6	22	2	Includes 5 fragments of 2-piece molded bottle	1870–1890
13	AH16	3	15	3	3-piece molded flask	1880–1910

Although the ranges provided by these materials are wide, they are generally consistent with stratigraphic origin. Those artifacts recovered in silt date to the period of land making within the tideflats using regrade spoil, while those recovered in sand correspond well with the dredged material. Most of the objects occur at depositional boundaries of those sediments, suggesting stable

surfaces for artifact accumulation. Only one item (568-3) was recovered in a large deposit of industrial waste, and the same is true of the other artifacts in the assemblage.

2.5 Discussion

Combining the lithofacies, the artifact temporal markers, and the historic record allows for reconstruction of the AGD. The three-dimensional model (see Exhibit 2-6) clearly shows how the sedimentary fill and archaeological materials were deposited progressively from north to south. The lithology also establishes the boundary between the Pleistocene and the Holocene, helps characterize the Holocene estuarine deposits, and illustrates the stratification within the historical fill. Artifacts provide temporal markers for dating these deposits.

2.5.1 Holocene/Pleistocene

The Holocene sediments along the southern portion of the AGD are alluvial deposits dominated by silty, fine sand. Possibly from the upper delta, they tend to form coarsening-upward sequences when found together. In some cases, a transition from silt to sandy deposits could be evidence of the transition from fine-grained sediments characteristic of deep-water estuarine low-energy environments to coarser-grained fluvial deposits. Fine-grained inclusions suggest rapid downstream movement of eroded wetland sediments through tidal and delta distributary channels. Cores AH-40 through AH-42, AH-23, -22, and -6 were excavated through such channels. Native American basketry or woven materials could possibly be preserved in these locations.

The assemblage of whole shell in sandy silt is distinct from that of other silty deposits, which generally contain dispersed fragmented shell, suggesting a unique environment of deposition for the older Holocene sequence in this area. The sandy silt deposits from S. King to S. Holgate Streets do not contain whole shells. They have no shell or highly fragmented pieces of shell, more typical of younger Holocene silt. None of the more recent shell was associated with any other material that might be construed as cultural (e.g., faunal remains from fish or mammal, fire-modified rock, or stained sediments).

The absence of Holocene sediments in AH-42 could be attributed to a lack of sediment deposition during the Holocene due to a geographical high in the area of the present First Avenue S. The missing assemblage may also be a result of historic land use, including street regrade projects such as the Jackson Regrades in 1883 and 1907–1910, or the First Avenue Regrade in 1898 (as is evident in cores drilled at the intersection of S. King Street and First

Avenue S.) (Miss et al. 2008a). The absence of Holocene sediment in the cores south of IB-234 is not likely due to the same factors. In this case, the boreholes may not have been drilled deep enough to encounter Holocene deposits. The Pleistocene contact is projected to be at least 70 fbs in the southern project area.

2.5.2 Historic Fill Distribution Patterns

The historic fill in the cores along the waterfront exhibits a high degree of vertical and horizontal variability. A single core typically contained four different deposits, exemplifying the complex infilling history of the tideflats. The stratified layers of industrial waste at the northern end of the AGD are evidence of early industrial dumping near S. King Street. Historic documentation supports the disposal of industrial waste in the tideflats, and this waste is manifested as uniform deposits that were dumped onto the southern end of Denny Island and slid into the tideflats. In particular, in cores AH-38 through AH-40, wood waste from the Stetson and Post Mill lies directly on Holocene sediments and extends south. Massive wood, sawdust, and lumber deposits span from 1875 to the turn of the twentieth century between S. King and S. Dearborn Streets. Coal bunkers from the Pacific Coast Coal Company and a nearby roundhouse deposited massive coal on sand and mixed fill. The land just south of S. Dearborn Street became a stable surface above the tide line around 1899.

At the same time, a wood-planked drive existed at the high tide line on the east, and channels were filled with sand and silt (AH-42 and AH-31). Commercial deposits associated with Railroad Avenue businesses were deposited on top of mill waste after 1889 in the northern portion of the AGD, while the southern portion of the AGD (still tidal) was being filled with dredge spoils. Mixed industrial deposits, associated with shipping wharves between S. Dearborn Street and S. Royal Brougham Way (now 15 to 20 fbs), were deposited after 1915. Regrade deposits were placed on top of the waste to level the area. The regrade spoils were neither continuously nor uniformly placed, so other smaller intentional fill deposits and accumulation from various activities on temporary surfaces may be found in this zone. The City's practice was to fill portions of the tideflats with garbage and other materials when regrade spoil was not available. The dredge and regrade deposits are much thicker in the southern portion of the AGD (approximately 30 feet thick south of S. Dearborn Street), which was filled at a late date.

Farther south on S. Royal Brougham Way, hydraulic fill is between 6.5 and 27.5 fbs. The dredge and regrade between First and Fourth Avenues S. follows a similar pattern to the sedimentary deposits along the Alaskan Way

Viaduct, thinning and deepening to the east instead of the south. The area to the east was a lagoon (Valentino 2008).

Deposits between 7 and 15 fbs, above the regrade and industrial deposits, are ubiquitous across the top of the AGD and are related to the spread of railroads and construction of SR 99 and the Alaskan Way Viaduct. The fill consists of discard, intentional fill, and industrial waste outside of the railroad alignments.

2.5.3 Analytic Zones

The historic fill can be divided into three temporal zones. To provide a summary analytic unit, the zones were introduced during the Electrical Line Relocation Project, which occurred in the eastern portion of the AGD (Alaskan Way Viaduct & Seawall Replacement Program 2007). These data, combined with the geoarchaeology of the 2007/2008 cores and excavations at bents 93 and 94, strengthen those zones and provide a baseline for interpreting the geology of the AGD and the likelihood of encountering archaeological materials (Alaskan Way Viaduct & Seawall Replacement Program 2007; Hodges and Boswell 2007). Each zone corresponds to a set of deposits and includes certain artifacts. Correlating the lithologies and artifacts with the historic record provides information on the source, relationships, and distribution of deposits within the fill (Exhibit 2-10).

Zone 1: Late Fill

Deposits in this zone are largely undifferentiated fill, although near-surface deposits have generally been poorly characterized because of vactoring (Miss et al. 2008a). A few instances of the brick and wood facies are in Zone 1, related to the southerly spread of railroads and filling required by the City during the first decade of the twentieth century. Subsequent removal of these railroads, construction of SR 99 and the Alaskan Way Viaduct, and general leveling of the area resulted in more disturbances and additional fill. Outside the railroad alignments, Zone 1 consists of a mix of discard, intentional fill, and industrial waste. Zone 1 deposits cap the tideflat fill sequence, extend upward from the top of the railroad trestle grade, are sealed by asphalt, are generally no deeper than 10 to 15 fbs, and are dated from the completion of Railroad Avenue in about 1916 until completion of the viaduct in 1953.

Zone 2: Intentional Dredge/Hydraulic Fill

Spoil from the straightening of the Duwamish River, excavation of the East and West Waterways at the turn of the century, and sedimentary fill from the Second Denny Regrade and the Jackson Regrade were intentionally placed to make land in the tideflats beginning in 1894. In general, the dredge

sedimentary fill is sand and the regrade deposits are silt. Individual artifacts are occasionally present in the hydraulic fill and regrade deposit of Zone 2, and there are occurrences of interbedded heterogeneous fill layers containing cultural materials such as brick, metal, and glass. Artifacts within the dredge and regrade deposits support attribution of the silt to a date no later than 1910 and support a time span of 1894 to 1916. Where dredge can be distinguished from hydraulic fill, the latter is deposited beginning in 1911.

Zone 3: Industrial Fill

This unit is composed primarily of industrial waste, such as wood, sawdust, lumber, coal, and cinders. The unit extends south from Denny Island, directly overlays Holocene sediments, and interfingers with Zone 2. It represents the dumping of industrial waste and filling on the tideflats by early commercial activities. In the AGD, Zone 3 began accumulating as early as 1875 when the Post and Stetson mill began to extend southward. Potential exists for this material to date as early as 1854. Zone 3 is bounded by Zone 2 or Zone 1 deposits, giving it an upper age of about 1916.

The opportunity to observe massive fill and industrial deposits was recently provided by a large, open-pit excavation on the western side of First Avenue S. between S. Dearborn Street and S. King Street (visited May 5, 2008). The excavation showed wood and lumber at approximately 30 fbs. Zone 3 was marked by a massive deposit of wood, lumber, and wood waste. The profile walls of the excavation had been shored for protection, so it was not possible to see the full depth of the facies (Exhibit 2-11).

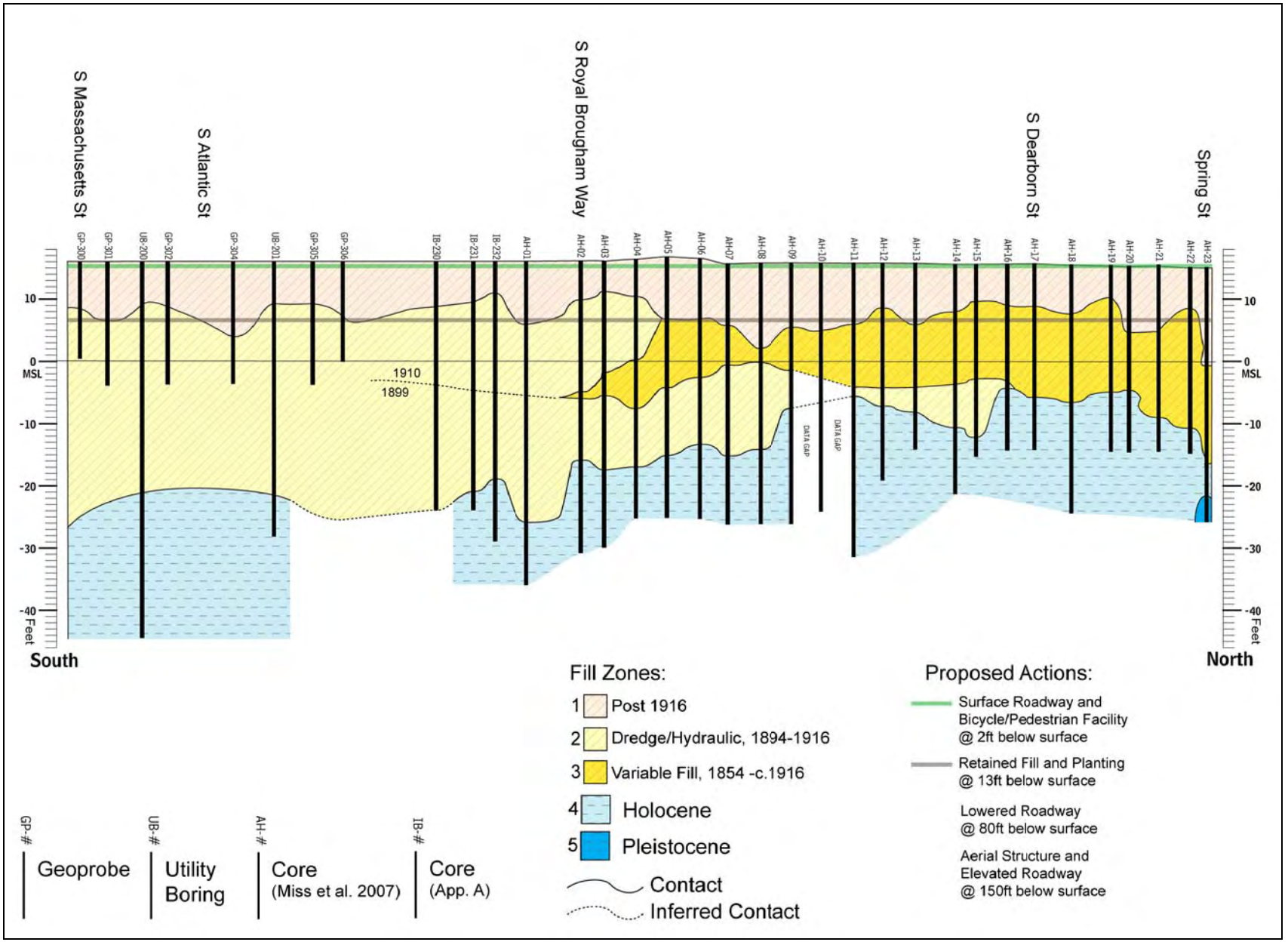

Exhibit 2-10. Zones within the Historic Fill

Exhibit 2-11. Open Pit Excavation on First Avenue S. at the Intersection with the Alaskan Way Viaduct

2.5.4 Zones and Historical Content

Those industries most likely to be represented in subsurface excavation, by zone, are provided in Exhibit 2-12. With this data, historic properties can be better identified when encountering zone interfaces and diagnostic artifacts during construction.

2.6 Implications for Historic Property Distribution

Based on this review of previous work, data from geotechnical sources, and recent core collection, the following predictions have been developed for the location and age of the three possible archaeological historic property types:

Pre-Contact – The most likely places for preservation of archaeological materials from the early Holocene period would be landforms such as beaches, spits, and lagoons that formed along the paleoshorelines associated with early Holocene lowered sea levels. The current borehole data do not clearly identify any paleoshoreline features and, in fact, suggest that in spite of lower global sea levels, most of the AGD was under water during this period.

Exhibit 2-12. Historic Themes and Potential Properties for the AGD from South to North by Segment

Segment	Zone 1 (1916+)	Zone 2 (1894-1916)	Zone 3 (1854-c. 1916)
S. King Street to former Charles Street	**Transportation:** (railroad tracks, Alaskan Way S., freight yard, Dearborn St.); **Government:** (utilities)	**Transportation:** (Dearborn St., Seattle Terminal and Elevator RR tracks, Railroad Avenue); **Industry:** (Stetson and Post Mil property, Queen City Boiler Works, Pacific Coast Co., Oregon and Washington Railroad and Navigation Co. Freight Yard); **Commercial:** (Occidental Trust Co., United Warehouse Co.	**Transportation:** (Seattle Terminal and Elevator RR Co.); **Industry:** (Stetson and Post Mill Co.)
former Charles Street to S. Royal Brougham Way	**Transportation:** (Railroad Avenue, freight yard, Alaskan Way S., S. Royal Brougham Way); **Government:** (utilities)	**Residential:** (dwellings, stables, tenements, boardinghouse); **Commercial: (**dairy room; wire fence storage, restaurant, American Steel and Wire Co. Warehouse, vacant buildings); **Transportation:** (Norman Street, Railroad Avenue); **Industrial:** (P.V. Dwyer Bros. Foundry; Seattle Ice Co.; Machinery and Pattern Storage, Seattle Mattress and Upholstery Co., saw works, Kent Lumber Co., Moran Bros. Co. Shops, Chas. A Zorn Furniture Factory, McSorley Bottling Works, Northwestern Iron Works).	**Transportation:** (Seattle Terminal and Elevator RR Co.); **Industry:** (Moran Bros. Co. Shipyards)
S. Royal Brougham Way to S. Atlantic Street	**Transportation:** (railroad tracks, Alaskan Way S.); **Government:** (utilities)	**Transportation:** (Railroad Avenue, wharf, planked drive); **Commercial:** (Erlich Harrison Hardwood Lumber Co., stables, American Paper Co. Paper Warehouse); **Industry:** (Seattle Bridge Co. Tool House, Washington Wire Works & American Engineering Works, Variety Iron Works)	**Transportation:** (Seattle Terminal and Elevator RR Co.)
S. Atlantic Street to S. Massachusetts Street	**Transportation:** (railroad tracks, Alaskan Way S.); **Government:** (utilities)	**Transportation:** (Railroad Avenue); **Commercial:** (offices)	Tideflats
S. Massachusetts Street to S. Holgate Street	**Transportation:** (railroad tracks, Alaskan Way S.); **Government:** (utilities)	**Transportation:** (Railroad Avenue)	Tideflats
S. Holgate Street to S. Walker Street	**Transportation:** (railroad tracks, Alaskan Way S.); **Government:** (utilities)	**Transportation:** (Railroad Avenue)	Tideflats

The depositional sequences in the lower portions of the Holocene deposits also do not indicate periods when dry land was temporarily above the level of the proglacial lakes or, later, above sea level during the early Holocene, in spite of uplift associated with glacio-isostatic rebound (estimated to range up to 90 feet [27.4 meters]) and the considerably lowered global sea level at the close of the Pleistocene.

The upper Holocene sedimentary sequences preserved in the boreholes show gradual shifts in the depositional environments under the APE from bay floor to pro-delta and delta-front environments as the Duwamish River delta arrived at and prograded Elliott Bay. The uppermost 10 to 15 feet (3.0 to 4.6 meters) of sediments just under the historical fill document the emergence of the tideflats, or intertidal zone, on top of the delta. The 1879 United States Coastal Survey map of southern Elliott Bay (see Exhibit 2-1) clearly shows the character of the historical tideflats.

The highest potential for preservation of late Holocene pre-contact archaeological deposits is near S. King Street, where delta front sediments have onlapped Pleistocene sediments to within 10 feet (3.0 meters) below mean sea level or about 25 feet (7.6 meters) below the present ground surface. The potential for complex archaeological deposits such as shell middens, food processing features, and domestic structures increases north of the APE and is highest on Denny Island itself.

The APE and Denny Island are north of the Seattle Fault Zone, and the area just north of the fault zone may have experienced subsidence in association with the A.D. 900 earthquake. At West Point, about 3 miles (5 kilometers) to the north, subsidence is estimated to have been about 3 feet (1.0 meter), but closer to the fault the amount may have been much less. It is not clear how subsidence of less than 3 feet (1.0 meter) would have affected the shoreline associated with a 2500 B.P. sea level still-stand around Denny Island, but there is a possibility that some of these shoreline features and associated archaeological deposits may be preserved at shallow depths in the upper Holocene sediments in the vicinity of Denny Island.

The potential for archaeological deposits decreases south of Denny Island in the APE. The archaeological coring program sampled the upper 10 to 20 feet (20 to 30 feet [6.1 to 9.1 meters] below mean sea level) of the Holocene sediments along the APE alignment and consistently documented sequences indicative of the gradual emergence of the tideflats, but found no evidence that supratidal surfaces had been elevated above the intertidal zone. Therefore, there is no potential for

archeological deposits, other than those related to resource gathering on the tideflats over approximately the last 500 to 1,000 years. Resource gathering would have involved the use and maintenance of weirs and traps for fish, while waterfowl and shellfish were probably gathered along with estuarine plants. Artifacts and features produced by such activities would include wooden stakes and lattice, basket traps, alignments of stone, and isolated stone or bone artifacts.

Historic-era Native American – Denny Island, at the northern end of the APE and outside the AGD, was home to *Djidjdkila'lltc* village, a dancehouse, and hop-pickers encampments. Historic-era Native American archaeological remains may be difficult to distinguish from either other historic remains or pre-contact remains unless distinctive artifacts or assemblage characteristics are identified. Like the pre-contact and historic materials, the greatest potential is north of S. Royal Brougham Way near former Denny Island and vertically at or near the native historic surface, whether Pleistocene or estuarine sediments. The tideflats continued to be exploited through much of the nineteenth century in traditional ways for traditional purposes. Distinguishing pre-contact from historic artifacts and features could prove difficult without specialized analyses, like radiocarbon age assay for organic artifacts.

Historic – Material older than about 1910, other than remains of the Seattle Terminal & Elevator Company trestle, should not occur south of S. Atlantic Street unless incorporated into fill placed there after 1894. North of S. Atlantic Street, fill and mass deposits supported industries and manufacturing, early infrastructure, warehouses and other business, and irregular residential use. Use of wharves and floating residences means that cultural material may occur above, below, and even within the dredge/regrade deposits. After the end of the dredge/regrade filling, about 1910, the surface continued to be raised by much more varied deposits. After 1916 the railroads and their associated facilities occupy the Alaskan Way corridor and most of the APE and fill to that elevation is complete. Additional fill related to the relocation of the railroad facilities to make way for the viaduct and SR 99 caps this sequence of deposits. Stable surfaces once supratidal may have hosted occupation or simply been the repository for discard and by-product accumulation.

Chapter 3 Effects

3.1 Operational Effects

Operation of the Project would not affect intact archaeological resources.

3.2 Construction Effects

Construction excavation for project facilities could directly affect potentially significant archaeological deposits. To date, no such properties have been identified.

3.3 Indirect Effects

No indirect effects on significant archaeological deposits would occur.

3.4 Cumulative Effects

Potential effects to archaeological properties from construction of the Project would combine with effects of other planned projects in areas within the city of Seattle that have a probability for significant pre-contact, ethnographic period, or historic period archaeological resources. Loss and degradation of non-renewable archaeological resources could constitute a cumulative effect by reducing the finite number of archaeological sites associated with the Elliott Bay tideflats.

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Chapter 4 Mitigation

There are no unavoidable adverse effects to historic properties currently known within the AGD.

Because sub-surface exploration has been limited, eligible archaeological properties may yet be identified and damaged by construction. Potential adverse effects will be resolved in a Section 106 MOA developed among WSDOT, FHWA, Washington State Department of Archaeology and Historic Preservation (DAHP), Advisory Council on Historic Preservation (ACHP), affected tribes, and the City of Seattle. The MOA identifies responsible parties for complying with elements of the agreement, outlines mitigation measures and an archaeological monitoring plan that would be applied, and binds signatories to comply with the mitigation measures.

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Attachment A:
Methodology Used in the
2007 and 2008 Coring Programs and the
Resulting Core Logs (with Timelines)

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METHODOLOGY

Twelve boreholes were dug with a rotosonic drill from which continuous cores were extruded into plastic sleeves for transport to the NWAA archaeological core processing station in downtown Seattle. Once in the lab, the cores were logged, sampled by depositional layers, and processed using methods consistent with those employed by the NWAA/Environmental History Company (EHC) team for analysis of archaeological sonicores drilled for the nearby Alaskan Way Viaduct and Seawall Replacement Program (Miss et al. 2008).

Geoarchaeological observations were recorded as graphical logs depicting the vertical depositional sequence for each core, and after logging, the cores were bulk sampled, water-screened, and examined for archaeological residues.

Drilling

Prior to drilling, the top 7 feet of each sonicore was "vactored" using a high-powered air drill to break up dense sediments without damaging subsurface utilities. The sediment loosened by the air drill was vacuumed into a holding tank until the desired depth was reached, and was then placed back into the hole, which was then plugged. The entire hole was then drilled with the rotosonic drill rig, collecting first the disturbed vactored sediments and then the intact sediments below. The cores were drilled in 10-ft-long increments, called "runs," using a 7-inch inner diameter core barrel. Each 10-ft run was extruded from the core barrel into plastic sleeves in segments of 2 to 3 feet and labeled by top and bottom depth. The plastic sleeves used to contain the core segments were 9 inches in diameter in order to fit over the outer diameter of the core barrel while retrieving core sediments. The sleeves of sediment were transported to Shannon & Wilson and NWAA technicians where they were tested for environmental hazards and then logged, photographed, and archaeologically sampled. Typically, the measured length of the core did not match the core depths recorded on the sleeves due to the spread created when sediment from the 7-inch core barrel was extruded into the 9-inch plastic sleeves. In the lab, Shannon and Wilson technicians adjusted the depths and re-labeled the core sleeves. These adjusted depths are used in this report.

Testing

The cores were tested for hazardous materials during retrieval in the field and after transport to the lab to ensure environmental safety standards were met and that laboratory personnel were not exposed to unsafe levels of contamination. At the drill site, analytical samples were collected from the cores for testing. Once in the lab, a photoionization detector was used on every core to verify that levels of contamination met regulatory safety levels. The cores were then logged by the geotechnical consultant.

Core-logging

After contaminant testing and analysis were completed on each core segment, the sleeves were transferred across the lab to the archaeological processing area. The cores were laid out in vertical sequence, photographed, and logged. After the geoarchaeological logging was

completed, bulk sediment samples were collected, water-screened, and examined for archaeological residues. Geoarchaeological observations were recorded for the entire depth of each core on a written log depicting the vertical depositional sequence. Each depositional layer in the core was called a lithofacies, which is a depositional unit with distinct observable physical properties such as color, lithology, texture, and sedimentary structure (Boggs and Miall 2000). Each lithofacies is the product of a depositional process within a particular environment and has a set of distinctive lithologic characteristics owing to that environment. While an individual lithofacies can be interpreted as the product of a specific depositional process, a facies assemblage represents various types of depositional events that frequently occur together in the same overall depositional environment (Table A-1) (Miss et al. 2008).

Table A-1. Lithofacies Typology for Holocene Sediments

Modal Grain Size	Secondary Properties
G – Gravel	g – gravelly
S – Sand	s – sandy
Z – Silt	z – silty
W - Wood	m – massive
	f – fine
	d – detrital wood (sea wrack; driftwood)

The top of the Holocene-aged deposits underlying the historic fill sequence were breached in all but three of the boreholes. The Holocene sediments were logged using facies types based on the primary lithologic constituents in each depositional layer. The facies types are classified according to the modal grain size of the depositional layer, indicated with a capital letter. For example, a layer dominated by sand-sized sediments would be designated with the letter "S." Secondary properties were designated by a lower-case letter appearing to the right of the capital letter. The lower case letters may represent secondary constituents of the depositional unit, or may be used as an additional descriptor for the modal grain size. For example, in the facies type Sz, "S" indicates that sand is the primary constituent, with "z" (silt) as a secondary component. In the facies type "Sm," the "S" represents sand, with "m" (massive sand) modifying the grain size. Pleistocene deposits were not identified in any of the boreholes, as cores were only drilled to a maximum of 45 feet below the surface (fbs).

Each depositional layer in the historic fill was also assigned a lithofacies type based on observable properties such as color, texture, and the presence or absence of archaeological materials (Table A-2).

Facies types in which industrial materials (wood, coal, etc.) comprise 20% or more of that facies were assigned to the High Density group. Wood recovered could be from a variety of activities unrelated to structures, such as sawmill production, transportation of sawmill products, or other industrial waste, and is characterized by having been milled and encountered in small

fragments—not large pieces. Therefore, the Wood facies was assigned to the High Density group. The Lumber facies, however, consists solely of large deposits of disked wood. This differs from the Wood because the disked wood (lumber) was horizontally stacked when it was buried and was drilled through with the rotosonic rig. The result is a stack of circular 'disks' of wood indicative of a lumber yard, storage, decking, or other large lumber deposit buried in the fill.

The Sedimentary Fill facies group includes lithofacies considered clean relative to the overall nature of the fill—the facies in this group have little to no admixture of archaeological objects or matrix. In the present context these facies may represent deposition from a regrade or dredging project, or, at greater depths, represent wave reworking during early stages in the accumulation of the fill.

The Other facies group includes, Undifferentiated Fill (vactored and unvactored), and Sample Gaps. Undifferentiated Fill lacks a dominant archaeological constituent and does not have distinctive properties allowing it to be assigned to one of the other lithofacies types. Undifferentiated Fill layers tend to be poorly sorted with fragments of brick, wood, and other materials scattered throughout the matrix. This sediment and the archaeological materials are most common in the upper fill sequences, may have been vactored out of the upper seven feet of the borehole and then replaced in the hole before coring. Vactored Fill is not intact and does not retain its original stratigraphic order. A Sample Gap marks breaks in the core sequence where core sediment, for a variety of reasons, was not recovered.

Table A-2. Lithofacies Types and Facies Groups in the Historic Fill Sequence.

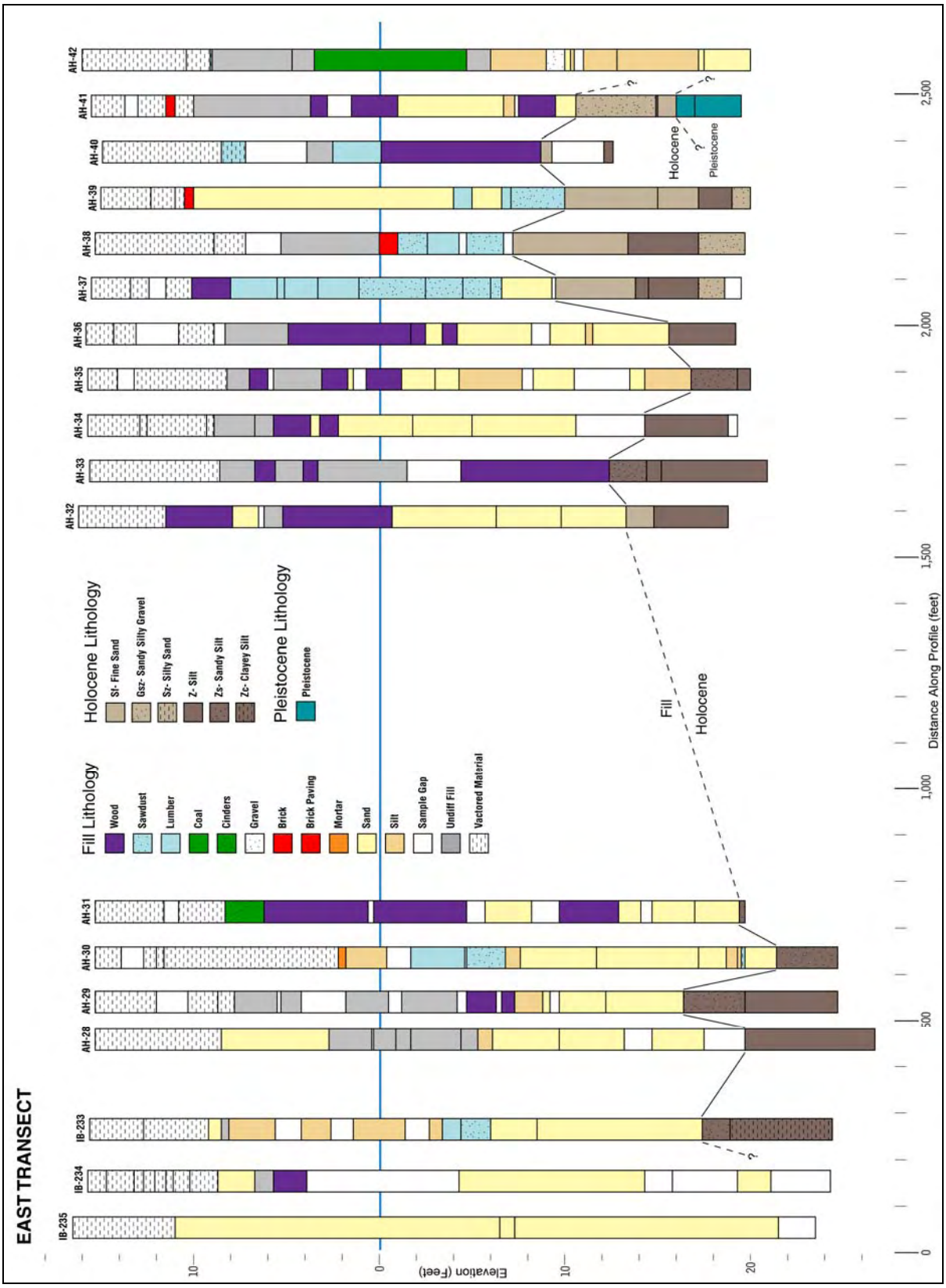
Group	Facies
High Density	Wood, Lumber, Sawdust, Coal, and Cinders
Building Material	Brick, Brick Paving, and Mortar
Sedimentary Fill Layers	Gravel, Sand, and Silt
Other	Undifferentiated Fill, Vactored Fill, Sample Gap

Sampling

After the geoarchaeological logging was completed, bulk sediment samples were collected, water-screened, and examined for archaeological residues. Bulk samples were collected from each lithofacies so archaeological materials could be correlated with the stratigraphic sequence. The cores were continuously sampled from the top of the core into the upper portion of the Holocene sediments by facies in 0.33 cubic ft increments. Massive deposits such as sawdust, wood, or coal, which contained no observable artifacts and very little sediment matrix, were not sampled. A minimum measured sample volume of 0.33 cubic ft (approximately 1–1.5 ft in downhole depth) was collected per lithofacies, but the entire facies was sampled if the volume of a facies was less than 0.33 cubic ft. The Holocene deposits were sampled starting at the base of the fill to a minimum depth of 5 feet below the base of the fill, or the bottom of the hole. Due to the varying thickness of the lithofacies in both the fill and the Holocene deposits, sample size

varied in volume from 0.06 to the maximum standard volume of 0.33 cubic feet, with thicker lithofacies yielding multiple samples. Each sample was assigned a unique sequential bag number used to track provenience throughout the screening and analysis process.

Because of the small sample volumes and the muddy matrix of most of the artifact-bearing sediments, the cores were water-screened to enhance artifact recovery. The water-screening station incorporated a nested screen system in which a screen box with ¼-inch mesh was aligned over a ⅛-inch mesh screen box. Since the purpose of the ⅛-inch mesh was to capture rare but potentially diagnostic small items, the ⅛-inch sample residues were examined and saved but not subjected to further analysis. The residue from the ¼-inch mesh was sorted and cataloged. Each screened sample was weighed, sorted, and categorized according to NWAA's historical archaeology classification system. Archaeological materials collected and analyzed included botanical, ceramic, faunal, shell, glass, metal, leather and textile, petrochemicals, and wood. A description of the screened sediment matrix was recorded on a Core Summary Log. Information summarized included the borehole number, sample top and bottom depths, and material discarded, such as gravels and naturally occurring wood. Specimen numbers were added subsequently to the end of the sample bag number to indicate how many discrete artifact classes, materials, forms, and types were recovered from each sample.


EAST TRANSECT
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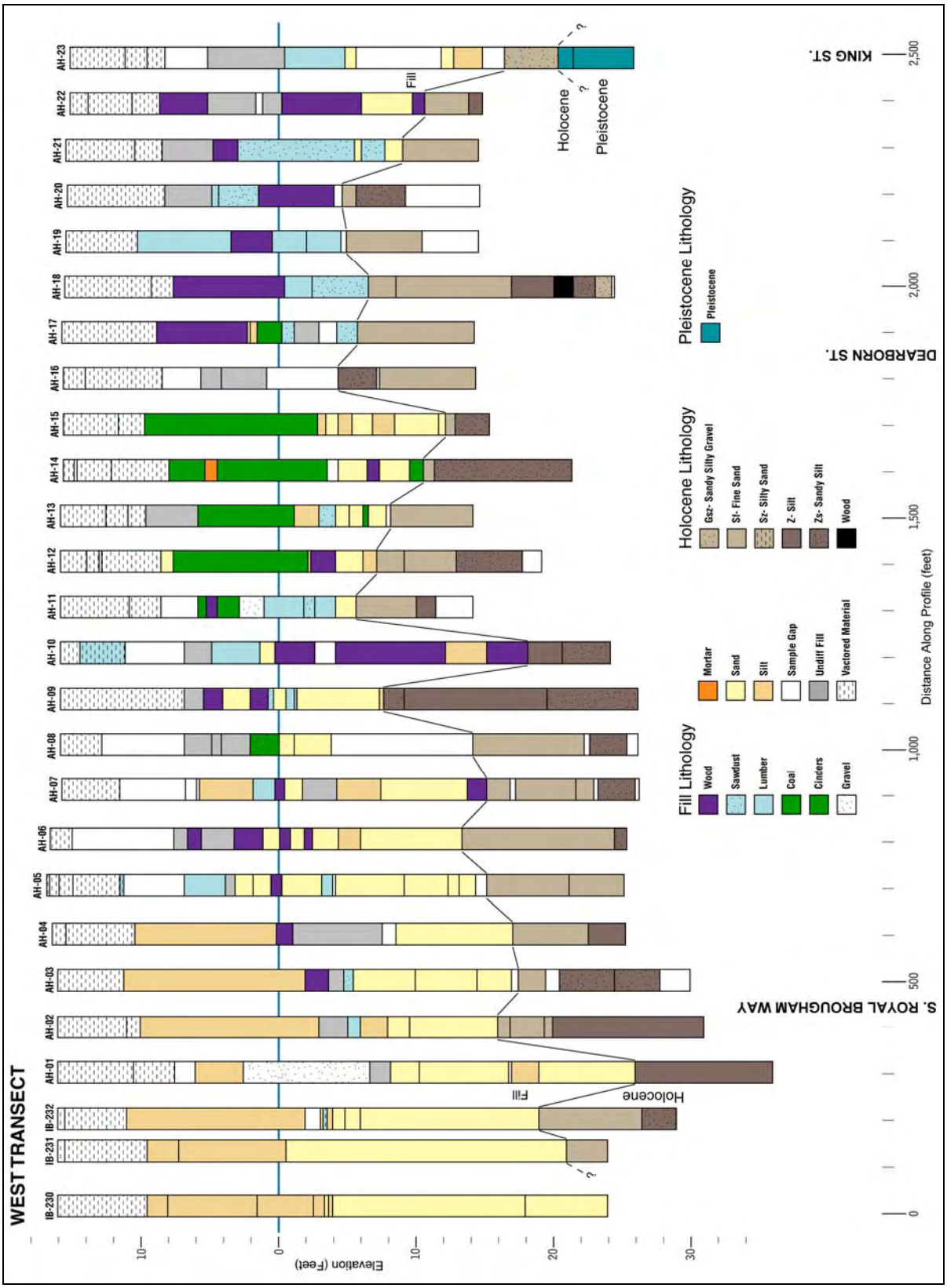
AH-41
AH-40
AH-39
AH-38
AH-37
AH-36
AH-35
AH-34
AH-33
AH-32
AH-31
AH-30
AH-29
AH-28
IB-233
IB-234
IB-235
Holocene
Pleistocene
Fill
Holocene
Holocene Lithology
St- Fine Sand
Gsz- Sandy Silty Gravel
Sz- Silty Sand
Z- Silt
Zs- Sandy Silt
Zc- Clayey Silt
Pleistocene Lithology
Pleistocene
Fill Lithology
Wood
Sawdust
Lumber
Coal
Cinders
Gravel
Brick
Brick Paving
Mortar
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material
Elevation (Feet)
10
0
10
20
0
500
1,000
1,500
2,000
2,500
Distance Along Profile (feet)


WEST TRANSECT
IB-230
IB-231
IB-232
AH-01
AH-02
AH-03
AH-04
AH-05
AH-06
AH-07
AH-08
AH-09
AH-10
AH-11
AH-12
AH-13
AH-14
AH-15
AH-16
AH-17
AH-18
AH-19
AH-20
AH-21
AH-22
AH-23
Elevation (Feet)
10
0
10
20
30
Fill
Holocene
Pleistocene
Holocene
Fill
S. ROYAL BROUGHAM WAY
DEARBORN ST.
KING ST.
0
500
1,000
1,500
2,000
2,500
Distance Along Profile (feet)
Fill Lithology
Wood
Sawdust
Lumber
Coal
Cinders
Gravel
Holocene Lithology
Mortar
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Z- Silt
Zs- Sandy Silt
Wood
Pleistocene Lithology
Pleistocene

Core Logs with Timelines

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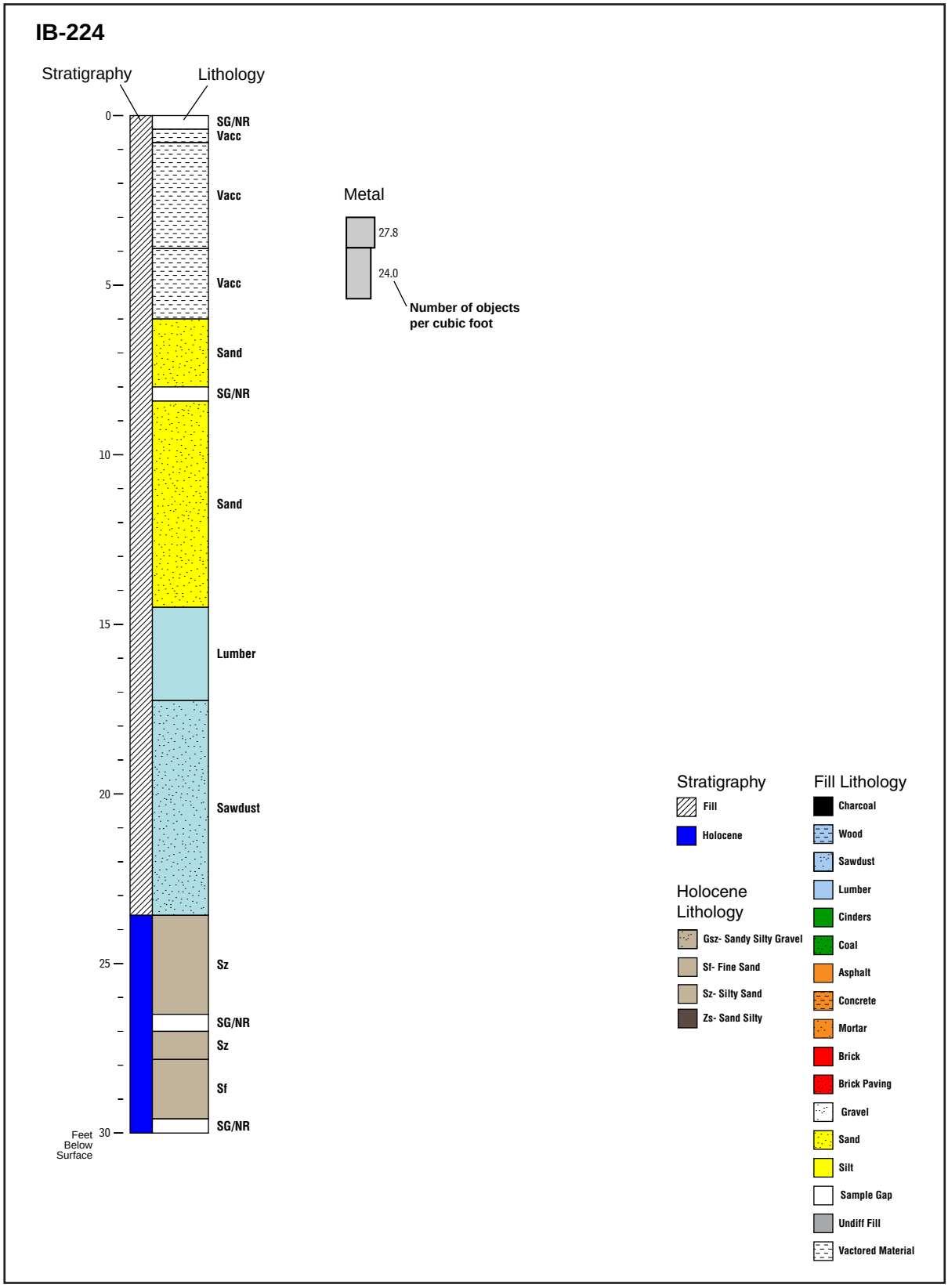
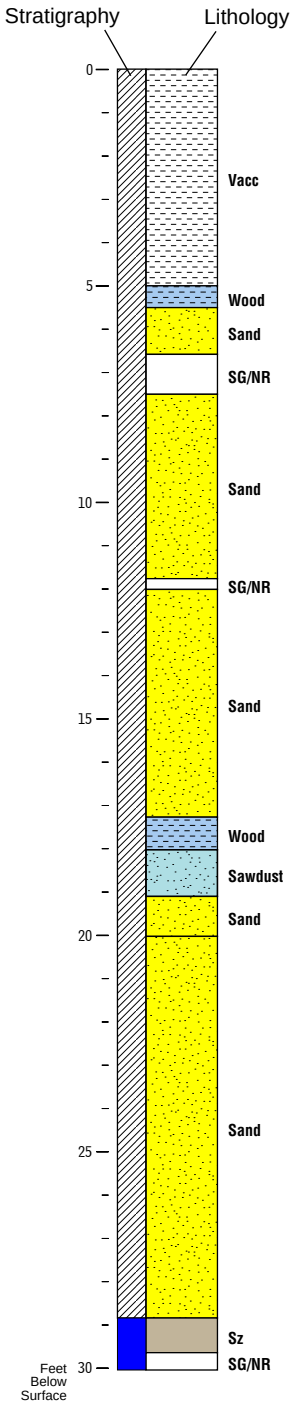

IB-224
Stratigraphy
Lithology
0
5
10
15
20
25
30
Feet Below Surface
SG/NR
Vacc
Vacc
Vacc
Sand
SG/NR
Sand
Lumber
Sawdust
Sz
SG/NR
Sz
Sf
SG/NR
Metal
27.8
24.0
Number of objects per cubic foot
Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-224		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981) Railroad Way also paved	fill; asphalt
1916	NPRR tracks on Railroad Way (1916 Sanborn map).	debris from RR
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological materials
1904	Railroad Way near intersection of NPRR tracks on trestles (1904-1905 Sanborn map).	debris from RR trestles
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1893	Private stables and warehouse adjacent to the east; rebuilt Stetson and Post Mill lumber storage facilities immediately to the north and east (NWAA 2007; 1893 Sanborn map).	possible milled wood debris, metal, hay, leather; lumber
1890	Seattle Terminal Railway and Elevator Company builds a 3-mile trestle on piles on the tide flats (NWAA 2007)	debris from RR trestle
1875	tide flats adjacent to tidal channel, near original shoreline (1875 t-sheet)	undisturbed sand and silt; fish weirs
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris

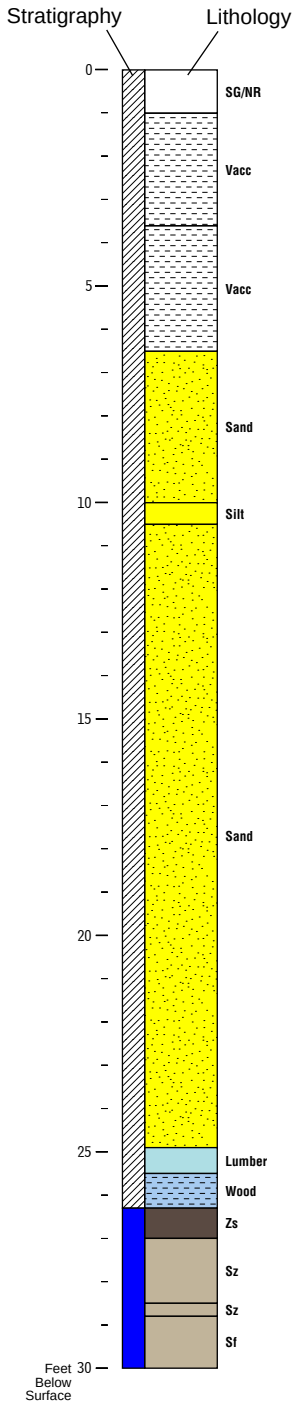
IB-225


Stratigraphy
Lithology
0
5
10
15
20
25
30
Feet Below Surface
Vacc
Wood
Sand
SG/NR
Sand
SG/NR
Sand
Wood
Sawdust
Sand
Sand
Sz
SG/NR


Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

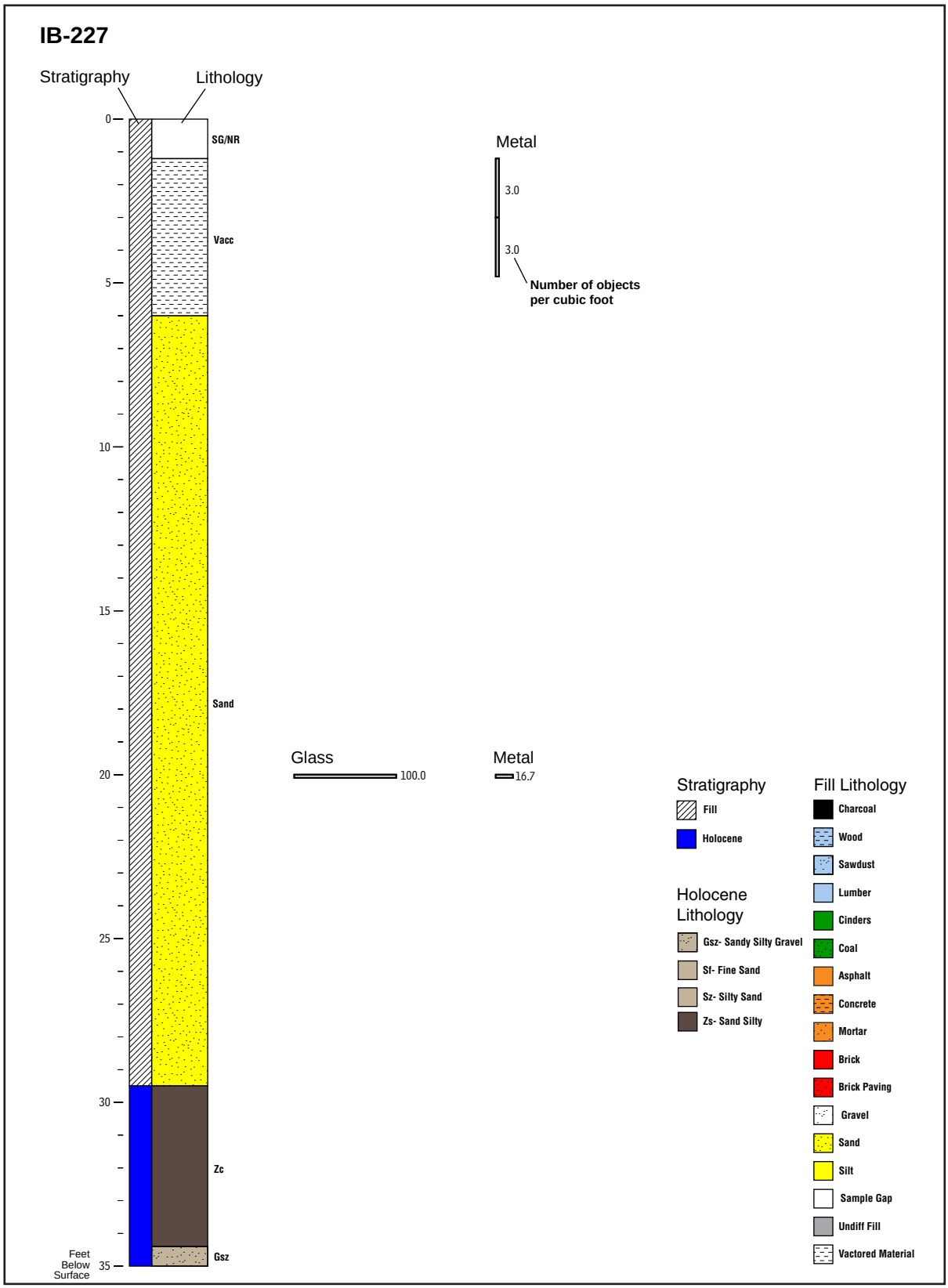
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-225		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1916	Dearborn Street (graded)	possible fill
1909-1912	Dearborn Regrade, area possibly received hydraulic fill; older deposits possibly truncated at graded surface	hydraulic fill: well-sorted sand and silt; little to no archaeological material; possible truncated deposits
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological materials
1904	Wood yard (1904-1905 Sanborn map).	lumber, milled wood debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1875	tide flats adjacent to tidal channel, near original shoreline (1875 t-sheet)	undisturbed sand and silt; fish weirs
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris

IB-226

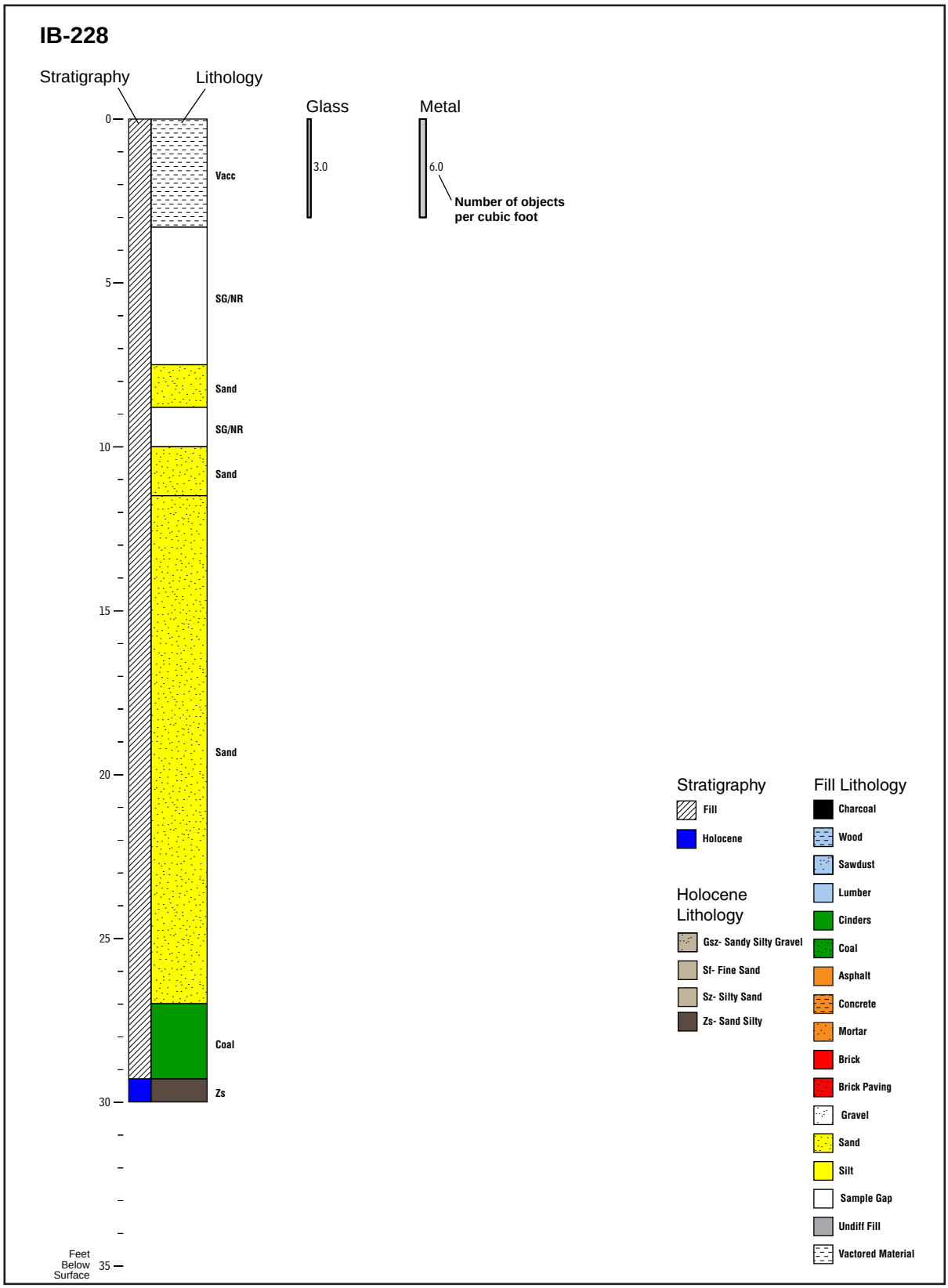

Stratigraphy
Lithology
0
5
10
15
20
25
Feet Below Surface 30
SG/NR
Vacc
Vacc
Sand
Silt
Sand
Lumber
Wood
Zs
Sz
Sz
Sf


Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-226		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1916	OWRR&N freight yard, RR tracks adjacent to core to east and west (1916 Sanborn map).	debris from RR; concrete, asphalt, glass, steel debris from freight shed
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological materials
1904	wood yard	lumber, milled wood debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1875	tide flats adjacent to tidal channel, near original shoreline (1875 t-sheet)	undisturbed sand and silt; weirs
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris

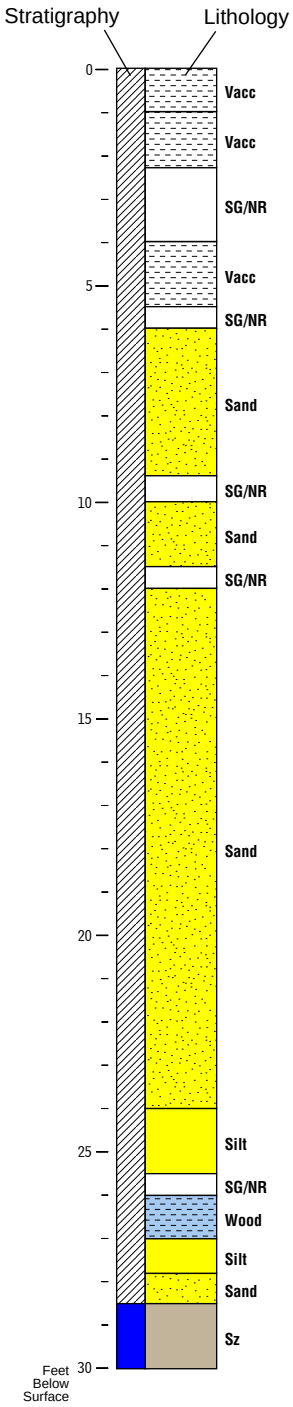

IB-227
Stratigraphy
Lithology
0
5
10
15
20
25
30
35
Feet Below Surface
SG/NR
Vacc
Sand
Zc
Gsz
Metal
3.0
3.0
Number of objects per cubic foot
Glass
100.0
Metal
16.7
Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-227		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1916	OWRR&N freight yard, RR tracks adjacent to core to east and west (1916 Sanborn map).	debris from RR
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological materials
1904	Dearborn Street; unmarked stable adjacent to core to the south (1904-1905 Sanborn map).	planking, piles; possible hay, metal debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1893	Dearborn Street on piles (1893 Sanborn map).	planking, piles
1875	tidal channel on tide flats, near original shoreline (1875 t-sheet)	undisturbed sand and silt
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris


IB-228
Stratigraphy
Lithology
Glass
3.0
Metal
6.0
Number of objects per cubic foot
0
5
10
15
20
25
30
35
Feet Below Surface
Vacc
SG/NR
Sand
SG/NR
Sand
Sand
Coal
Zs
Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

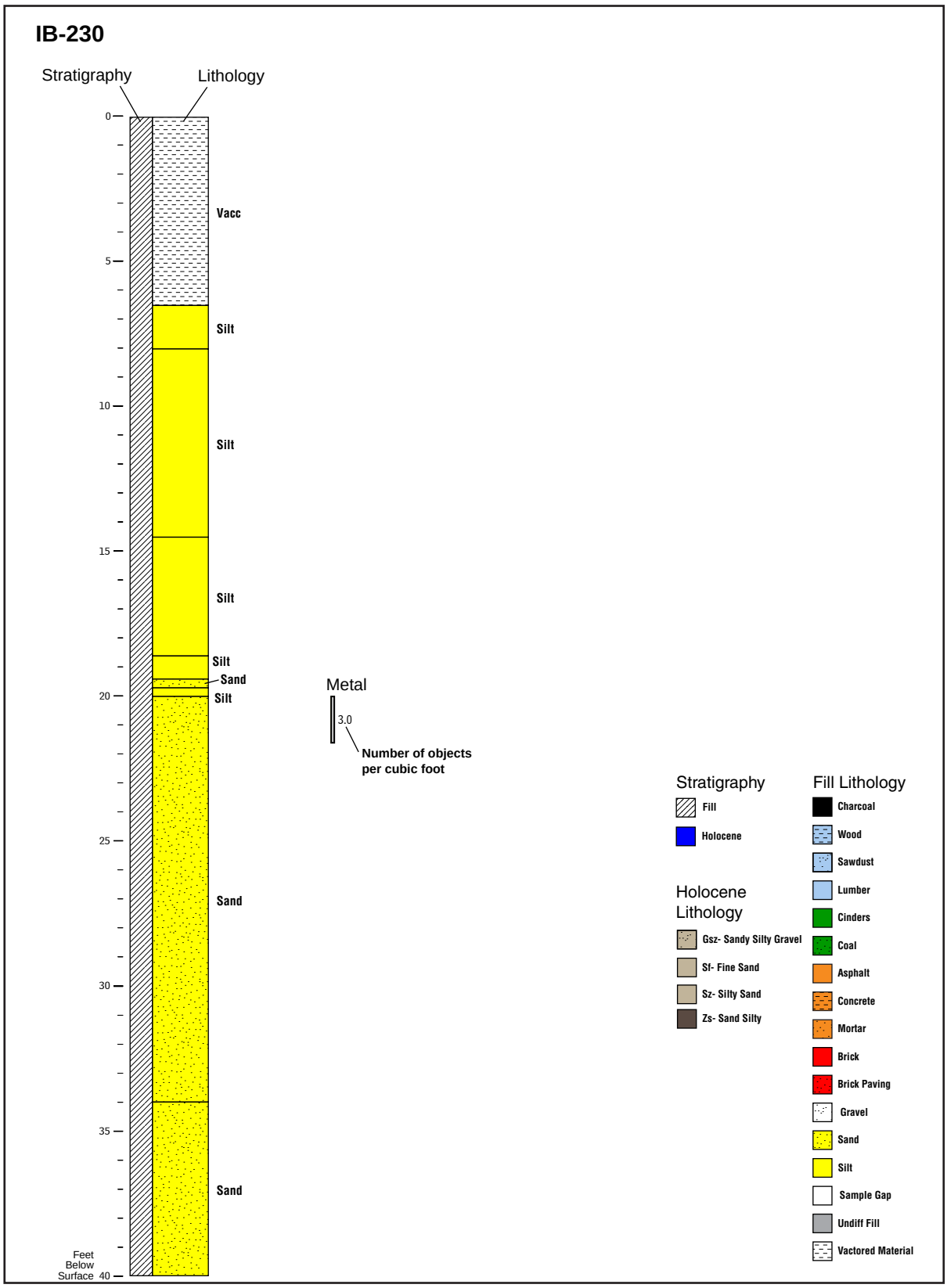
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-228		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1916	OWRR&N freight yard, RR tracks adjacent to core to east and west (1916 Sanborn map).	debris from RR
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological materials
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological materials
1904	United Warehouse Company building (1904-1905 Sanborn map).	structural debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1899	Unmarked building straddling Seattle Terminal Railway and Elevator Company RR trestle (1899 t-sheet)	possible RR debris
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1875	tidal channel on tide flats, near original shoreline (1875 t-sheet)	undisturbed sand and silt
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris

IB-229

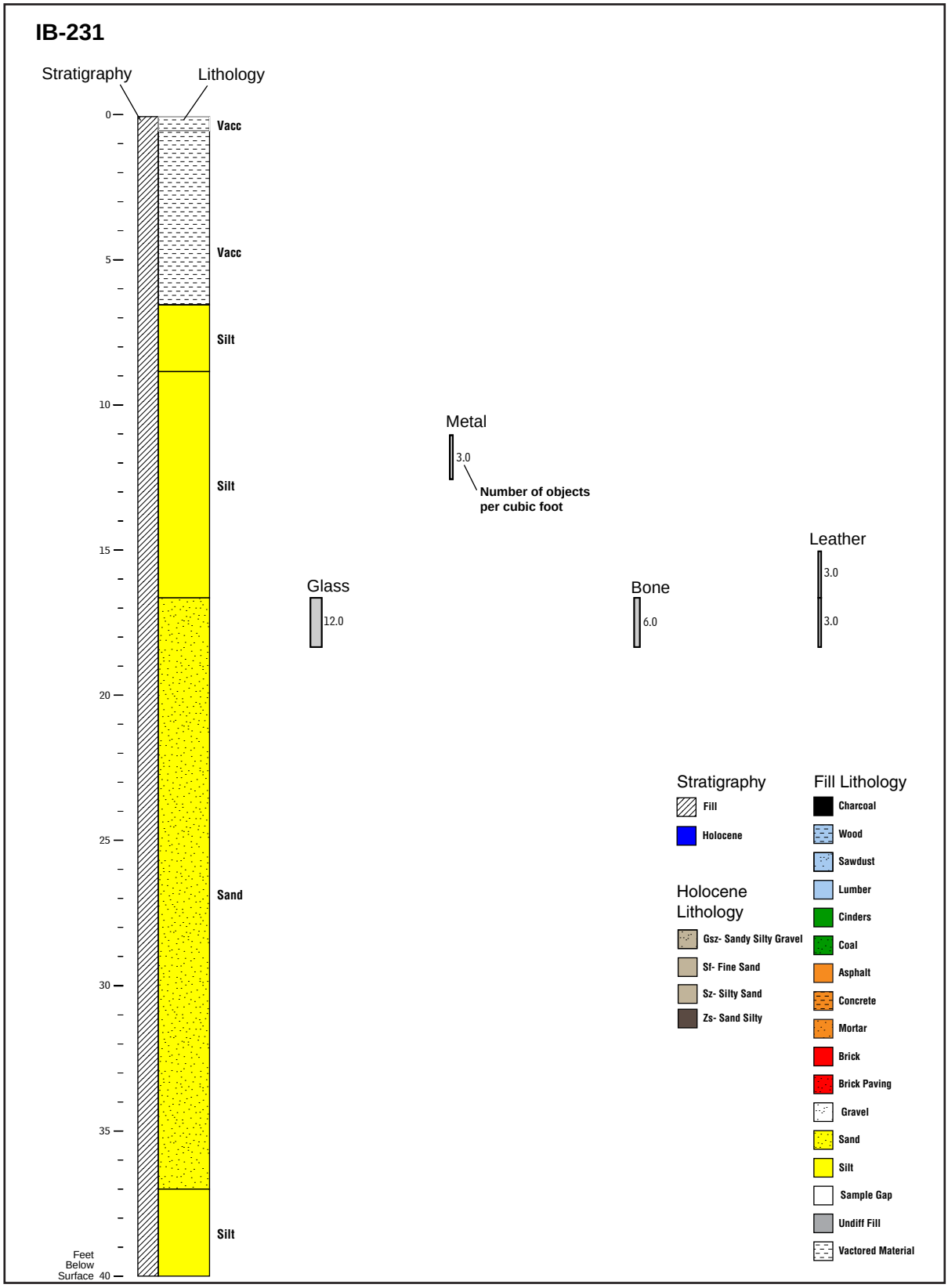

Stratigraphy
Lithology
0
5
10
15
20
25
30
Feet Below Surface
Vacc
Vacc
SG/NR
Vacc
SG/NR
Sand
SG/NR
Sand
SG/NR
Sand
Silt
SG/NR
Wood
Silt
Sand
Sz


Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

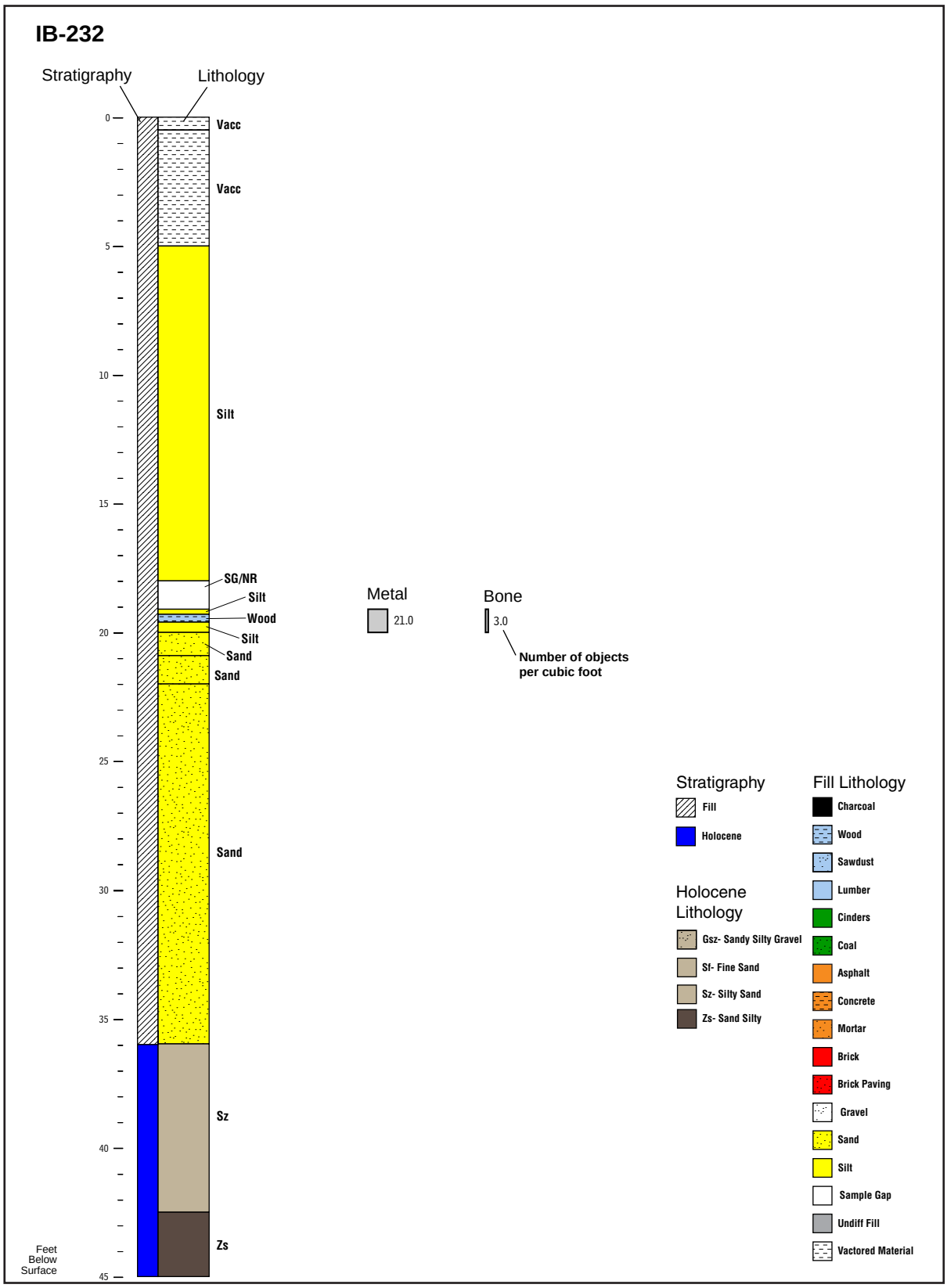
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-229		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1916	OWRR&N freight yard, RR tracks adjacent to core to east and west (1916 Sanborn map).	debris from RR
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological materials
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1904	Kent Lumber Company lumber shed (1904-1905 Sanborn map).	lumber
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1899	Unmarked building straddling Seattle Terminal Railway and Elevator Company RR trestle (1899 t-sheet)	possible RR debris
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1875	tide flats adjacent to tidal channel, near original shoreline (1875 t-sheet)	undisturbed sand and silt; weirs
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris


IB-230
Stratigraphy
Lithology
0
5
10
15
20
25
30
35
40
Feet Below Surface
Vacc
Silt
Silt
Silt
Silt
Sand
Silt
Sand
Sand
Metal
3.0
Number of objects per cubic foot
Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

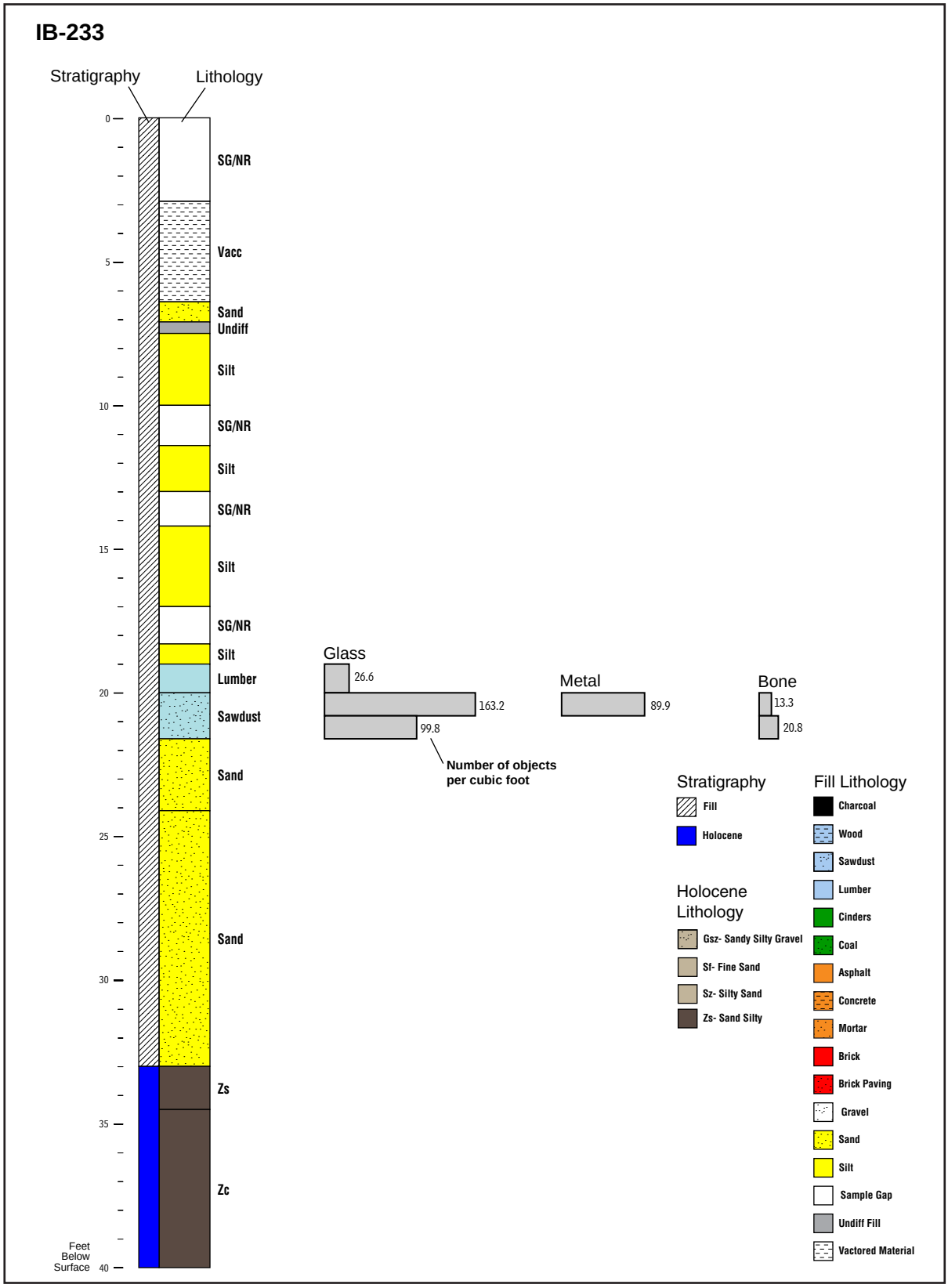
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-230		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and paved (Hershman et al. 1981)	fill; asphalt
1916	Railroad Ave, PCRR tracks connecting to CM&StPRY / OWRR&N Co. main tracks adjacent to core to the south (1916 Sanborn map).	debris from RR
1909-1912	Dearborn Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1907-1910	Jackson Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1904	RR tracks connecting to NPRR main tracks on Railroad Ave; Railroad Ave, being filled to the east (1904 Sanborn Map).	debris from RR; piles; possible dredge spoils
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris


IB-231
Stratigraphy
Lithology
0
5
10
15
20
25
30
35
40
Feet Below Surface
Vacc
Vacc
Silt
Silt
Sand
Silt
Metal
3.0
Number of objects per cubic foot
Glass
12.0
Bone
6.0
Leather
3.0
3.0
Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

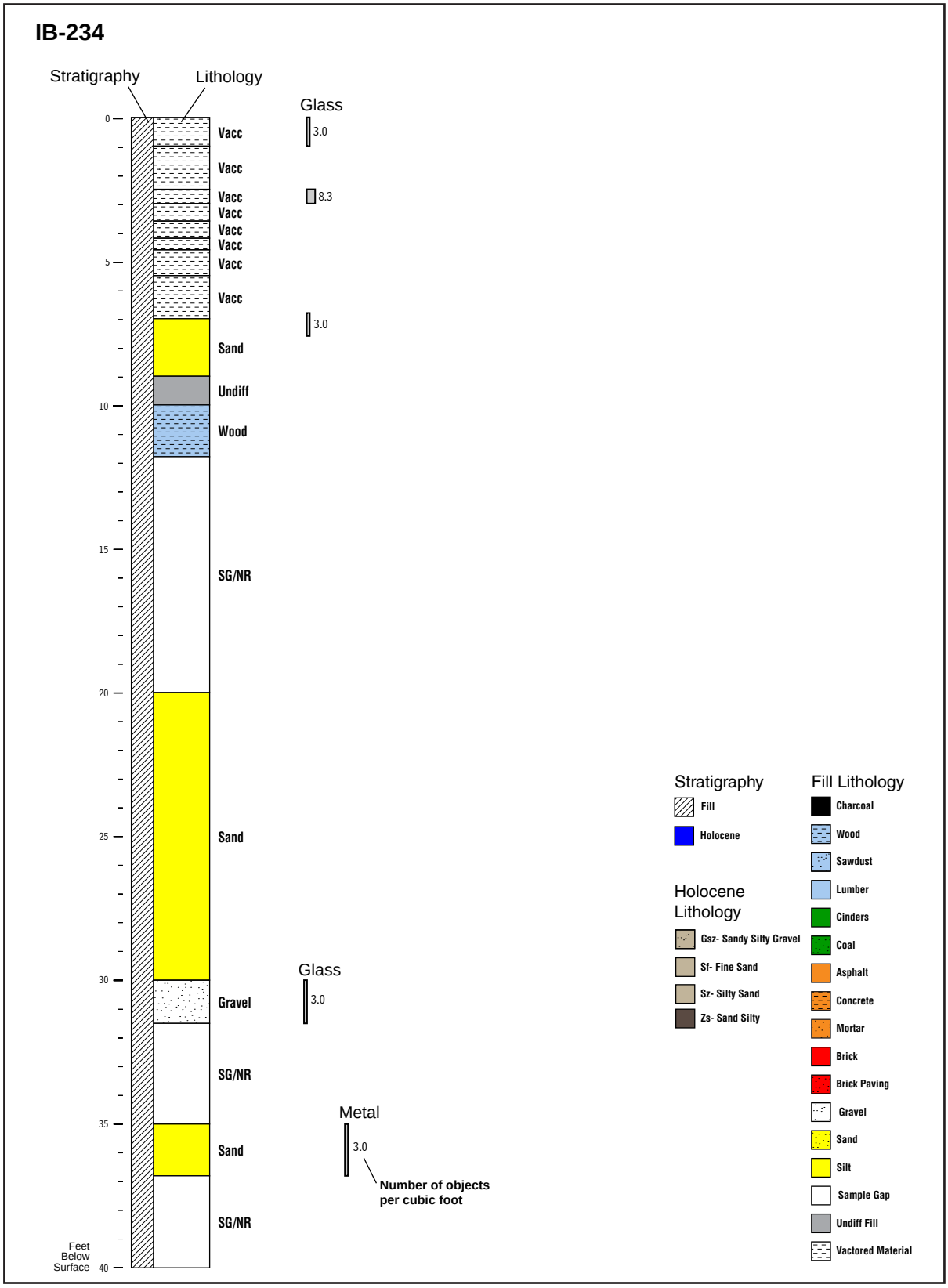
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-231		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and paved (Hershman et al. 1981)	fill; asphalt
1916	Railroad Avenue, PCRR, CM&StPRY / OWRR&N Co. tracks adjacent to core to the east (1916 Sanborn map)	debris from RR
1909-1912	Dearborn Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1907-1910	Jackson Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1904	Railroad Ave on piles, NPRR tracks adjacent to core to the east; Railroad Ave is being filled to the east (1904 Sanborn Map).	piles, debris from RR; possible dredge spoils
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris


IB-232
Stratigraphy
Lithology
0
5
10
15
20
25
30
35
40
45
Feet Below Surface
Vacc
Vacc
Silt
SG/NR
Silt
Wood
Silt
Sand
Sand
Sand
Sz
Zs
Metal
21.0
Bone
3.0
Number of objects per cubic foot
Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

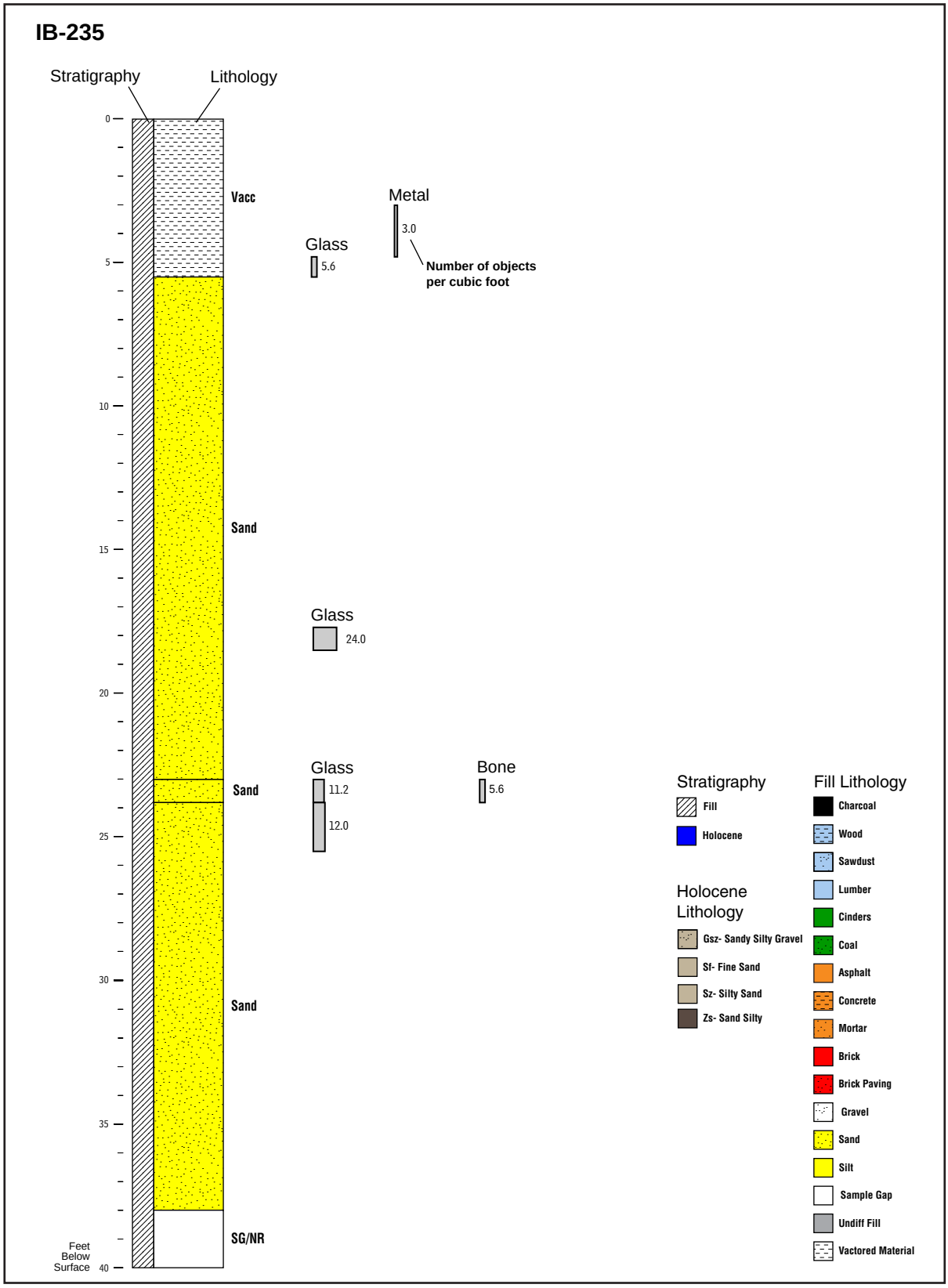
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-232		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and paved (Hershman et al. 1981)	fill; asphalt
1916	Railroad Avenue; CM&StPRY / OWRR&N Co. tracks to the east (1916 Sanborn map)	debris from RR
1909-1912	Dearborn Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1907-1910	Jackson Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1904	Railroad Ave on piles, NPRR tracks adjacent; Railroad Ave is being filled to the east (1904-1905 Sanborn Map).	piles, debris from RR trestles; possible dredge spoils
1904-1916	Ehrlich & Harrison Co. Lumber company facility adjacent to core to the west (1916 Sanborn map).	lumber and milled wood debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	area possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris


IB-233
Stratigraphy
Lithology
0
5
10
15
20
25
30
35
40
Feet Below Surface
SG/NR
Vacc
Sand Undiff
Silt
SG/NR
Silt
SG/NR
Silt
SG/NR
Silt
Lumber
Sawdust
Sand
Sand
Zs
Zc
Glass
26.6
163.2
99.8
Number of objects per cubic foot
Metal
89.9
Bone
13.3
20.8
Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-233		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and paved (Hershman et al. 1981)	fill; asphalt
1916	OWRR&N Co. freight tracks on Railroad Ave (1916 Sanborn map)	debris from RR; piles
1909-1912	Dearborn Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1907-1910	Jackson Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1904	RR trestle connecting to Railroad Ave immediately to the north, Railroad Ave being filled in to the west (1904-1905 Sanborn map)	debris from RR trestles; possible dredge spoils
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1898	Centennial Mill Company opens flour milling plant on wharf with rail access connecting to Railroad Ave immediately to the west and north of core (NWAA 2007; 1899 Sanborn Map).	debris from RR trestle
1897	area possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1890	Seattle Terminal Railway and Elevator Company builds a 3-mile trestle on piles on the tide flats (NWAA 2007)	debris from RR trestles
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris

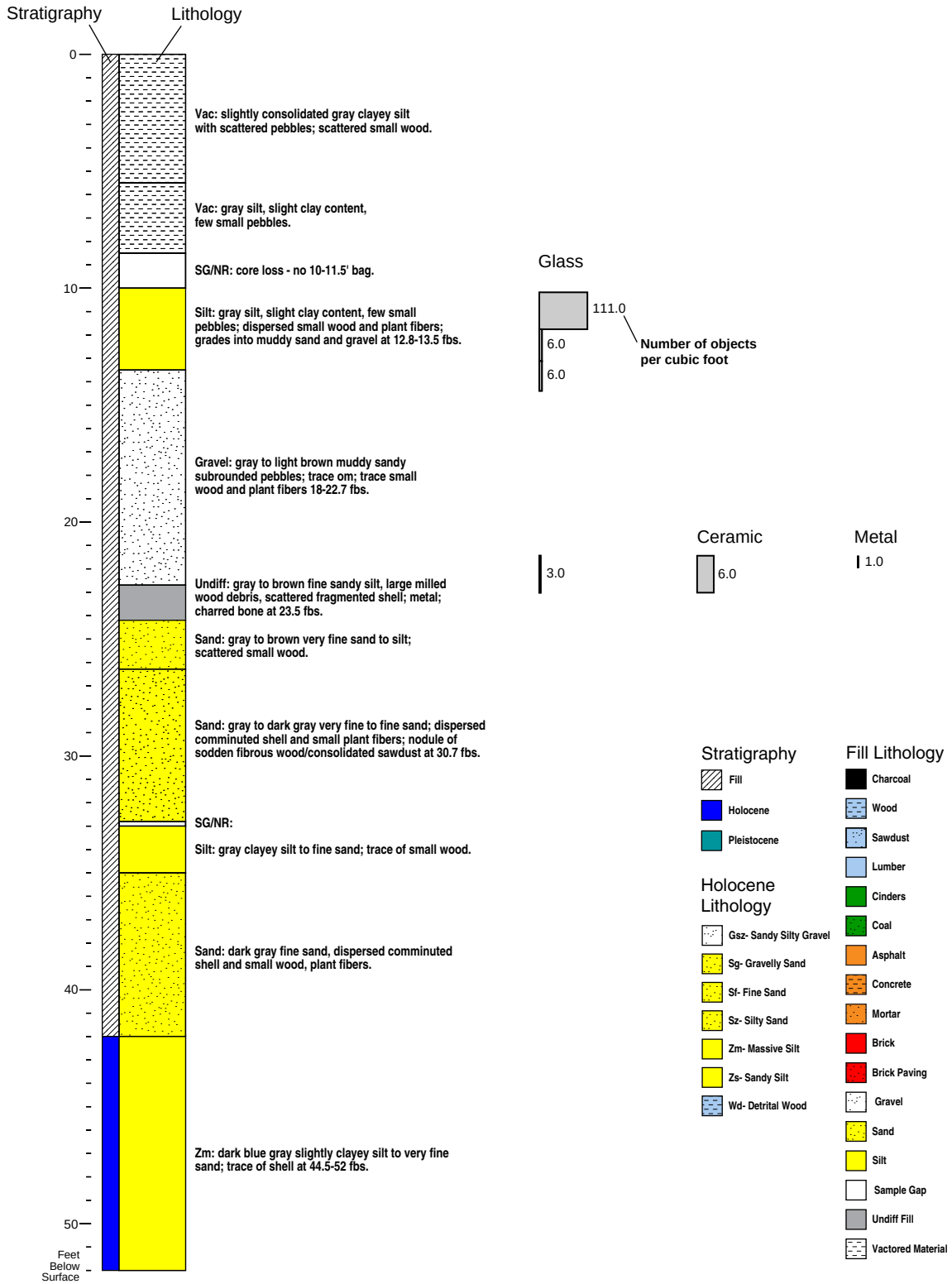

IB-234
Stratigraphy
Lithology
Glass
3.0
8.3
3.0
Vacc
Vacc
Vacc
Vacc
Vacc
Vacc
Vacc
Vacc
Sand
Undiff
Wood
SG/NR
Sand
Glass
3.0
Gravel
SG/NR
Metal
3.0
Number of objects per cubic foot
Sand
SG/NR
Feet Below Surface
0
5
10
15
20
25
30
35
40
Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-234		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and paved (Hershman et al. 1981)	fill; asphalt
1916	Railroad Avenue on piles, OWRR&N Co. freight tracks adjacent to core to the east and west (1916 Sanborn map)	piles; debris from RR
1909-1912	Dearborn Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1907-1910	Jackson Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1904	RR trestle adjacent to core to the east; Railroad Ave is being filled to the west (1904-1905 Sanborn map).	debris from RR trestle; possible dredge spoils
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	area possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1890	Seattle Terminal Railway and Elevator Company builds a 3-mile trestle on piles adjacent to core to the east (NWAA 2007)	debris from RR trestle
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris

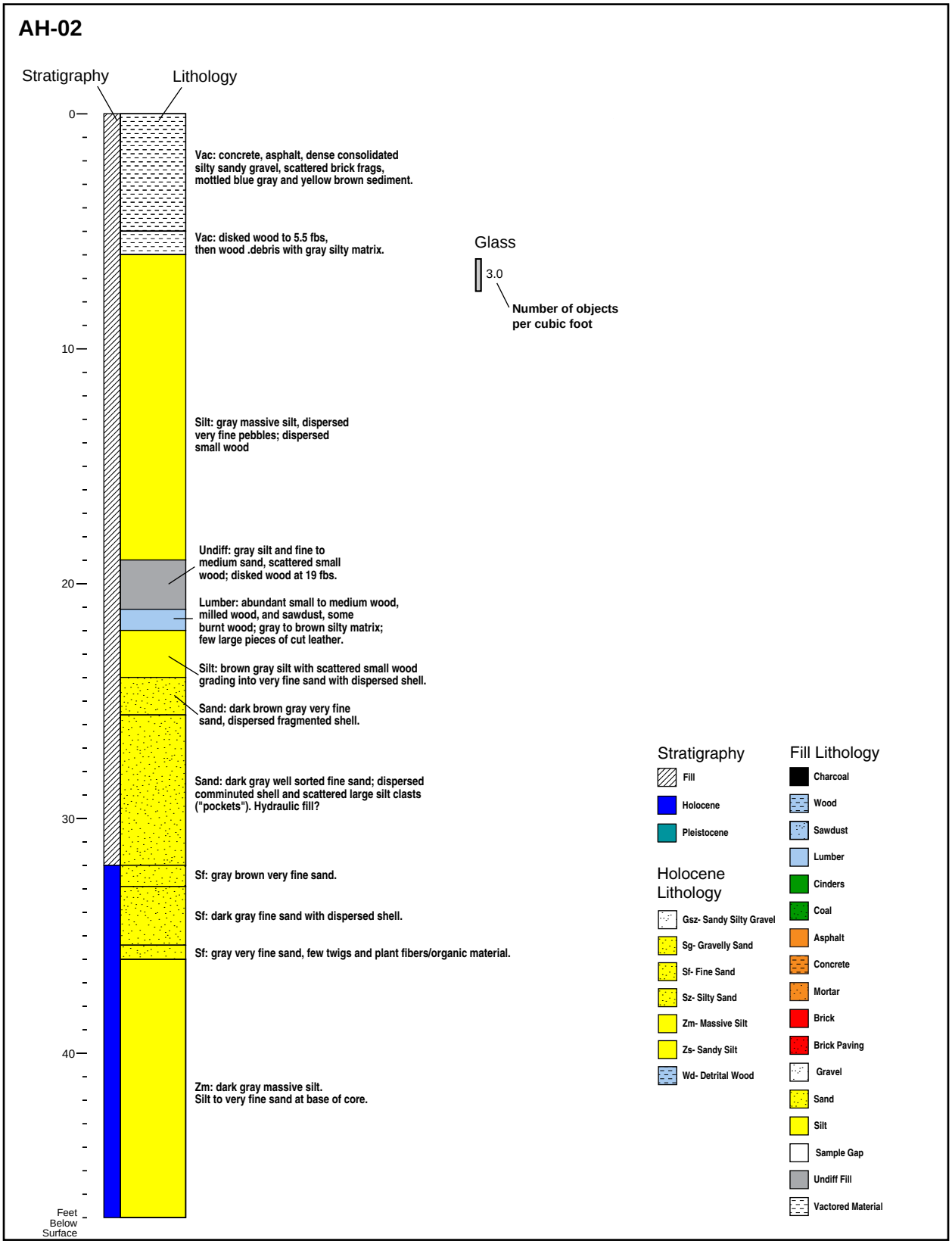

IB-235
Stratigraphy
Lithology
0
5
10
15
20
25
30
35
40
Feet Below Surface
Vacc
Sand
Sand
Sand
SG/NR
Glass
5.6
Metal
3.0
Number of objects per cubic foot
Glass
24.0
Glass
11.2
12.0
Bone
5.6
Stratigraphy
Fill
Holocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sf- Fine Sand
Sz- Silty Sand
Zs- Sand Silty
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
IB-235		
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and paved (Hershman et al. 1981)	fill; asphalt
1916	OWRR&N Co. freight tracks on Railroad Ave (1916 Sanborn map)	debris from RR
1909-1912	Dearborn Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1907-1910	Jackson Regrade, area near core possibly receives hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	area possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1890	Seattle Terminal Railway and Elevator Company builds a 3-mile trestle on piles adjacent to core to the east (NWAA 2007)	debris from RR trestle
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris

AH-01

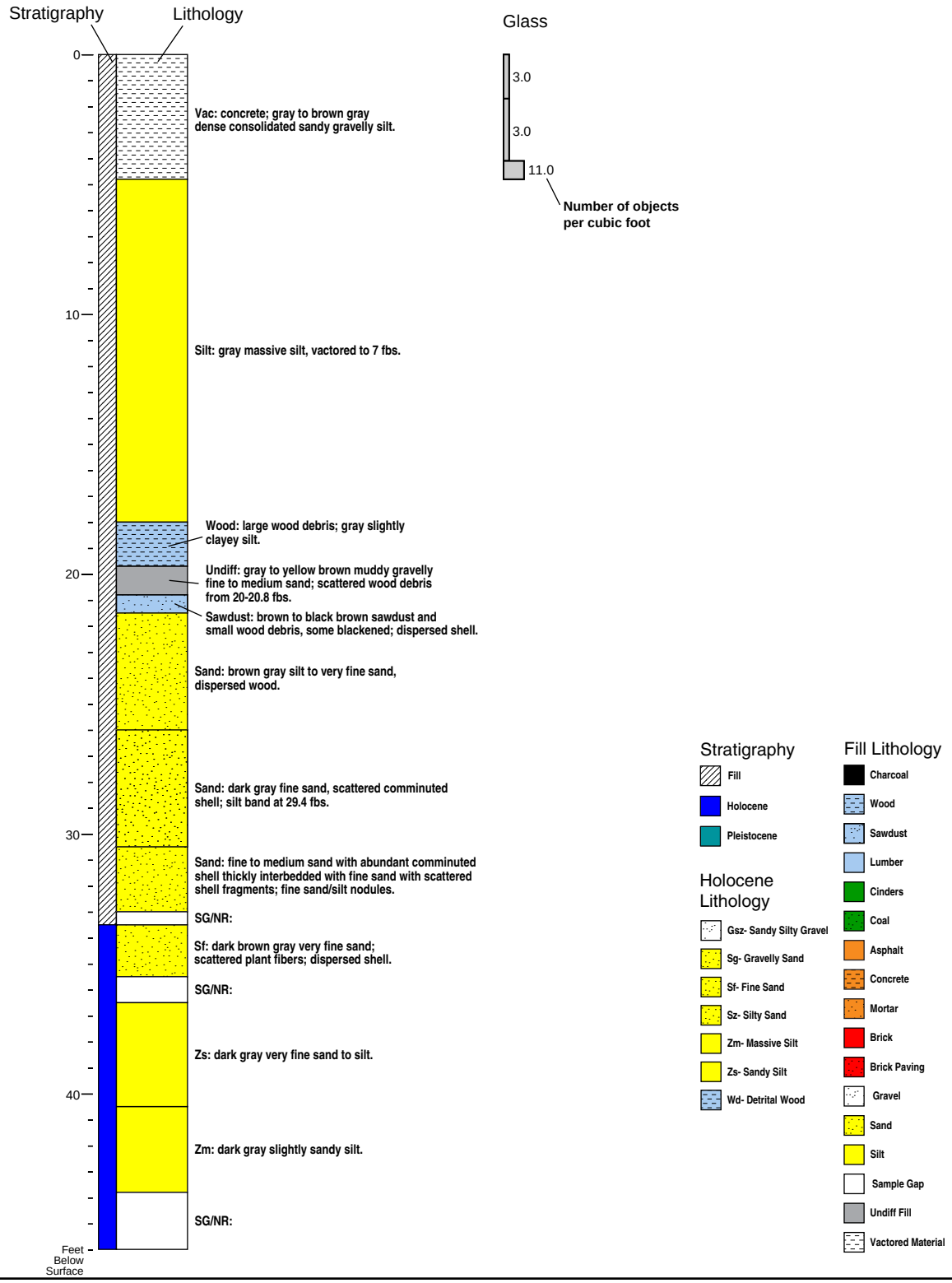

Stratigraphy
Lithology
0
10
20
30
40
50
Feet Below Surface
Vac: slightly consolidated gray clayey silt with scattered pebbles; scattered small wood.
Vac: gray silt, slight clay content, few small pebbles.
SG/NR: core loss - no 10-11.5' bag.
Silt: gray silt, slight clay content, few small pebbles; dispersed small wood and plant fibers; grades into muddy sand and gravel at 12.8-13.5 fbs.
Gravel: gray to light brown muddy sandy subrounded pebbles; trace om; trace small wood and plant fibers 18-22.7 fbs.
Undiff: gray to brown fine sandy silt, large milled wood debris, scattered fragmented shell; metal; charred bone at 23.5 fbs.
Sand: gray to brown very fine sand to silt; scattered small wood.
Sand: gray to dark gray very fine to fine sand; dispersed comminuted shell and small plant fibers; nodule of sodden fibrous wood/consolidated sawdust at 30.7 fbs.
SG/NR:
Silt: gray clayey silt to fine sand; trace of small wood.
Sand: dark gray fine sand, dispersed comminuted shell and small wood, plant fibers.
Zm: dark blue gray slightly clayey silt to very fine sand; trace of shell at 44.5-52 fbs.
Glass
111.0
6.0
6.0
Number of objects per cubic foot
3.0
Ceramic
6.0
Metal
1.0
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-1		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
1890	Seattle Terminal Railway and Elevator Company built a 3-mile trestle on plies across the tidelands immediately to the east and south (NWAA 2007)	debris from RR trestles
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Railroad Avenue between Northern Pacific RR main tracks on trestles (1904-1905 Sanborn map)	debris falling from RR trestles
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles, CM&StPRY / OWRR&N Co. tracks (1916 Sanborn map)	debris from RR
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris


AH-02
Stratigraphy
Lithology
0
10
20
30
40
Feet Below Surface
Vac: concrete, asphalt, dense consolidated silty sandy gravel, scattered brick frags, mottled blue gray and yellow brown sediment.
Vac: disked wood to 5.5 fbs, then wood .debris with gray silty matrix.
Silt: gray massive silt, dispersed very fine pebbles; dispersed small wood
Undiff: gray silt and fine to medium sand, scattered small wood; disked wood at 19 fbs.
Lumber: abundant small to medium wood, milled wood, and sawdust, some burnt wood; gray to brown silty matrix; few large pieces of cut leather.
Silt: brown gray silt with scattered small wood grading into very fine sand with dispersed shell.
Sand: dark brown gray very fine sand, dispersed fragmented shell.
Sand: dark gray well sorted fine sand; dispersed comminuted shell and scattered large silt clasts ("pockets"). Hydraulic fill?
Sf: gray brown very fine sand.
Sf: dark gray fine sand with dispersed shell.
Sf: gray very fine sand, few twigs and plant fibers/organic material.
Zm: dark gray massive silt. Silt to very fine sand at base of core.
Glass
3.0
Number of objects per cubic foot
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

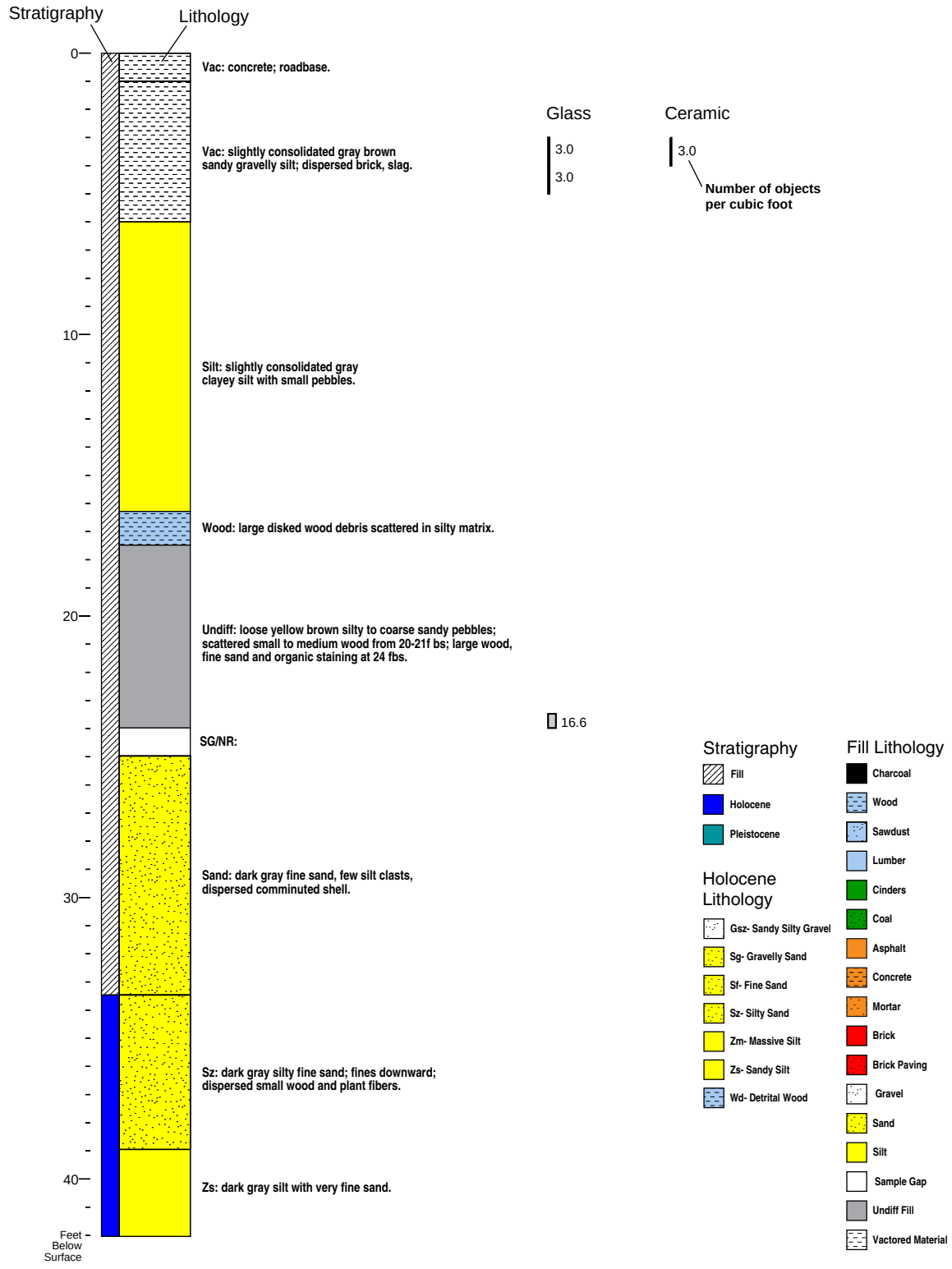
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-2		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
1893	McSorley Bottling Works upon wharf (1893 Sanborn map)	wharf planks; debris from bottling manufacture
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Railroad Avenue between Northern Pacific RR main tracks on trestles (1904-1905 Sanborn map)	debris falling from RR trestles
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles, CM&StPRY / OWRR&N Co. tracks (1916 Sanborn map)	debris from RR
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

AH-03

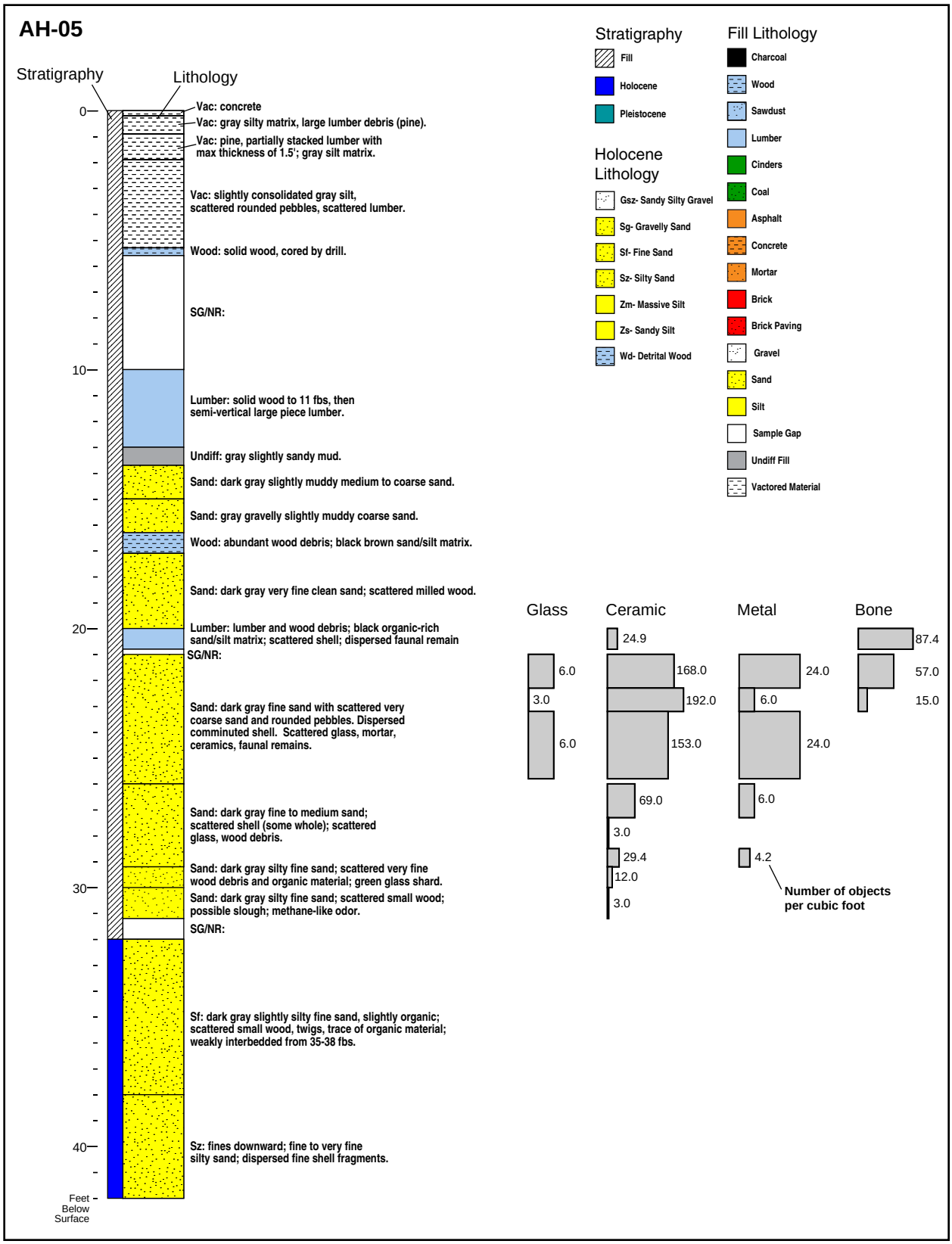

Stratigraphy
Lithology
0
10
20
30
40
Feet Below Surface
Vac: concrete; gray to brown gray dense consolidated sandy gravelly silt.
Silt: gray massive silt, vactored to 7 fbs.
Wood: large wood debris; gray slightly clayey silt.
Undiff: gray to yellow brown muddy gravelly fine to medium sand; scattered wood debris from 20-20.8 fbs.
Sawdust: brown to black brown sawdust and small wood debris, some blackened; dispersed shell.
Sand: brown gray silt to very fine sand, dispersed wood.
Sand: dark gray fine sand, scattered comminuted shell; silt band at 29.4 fbs.
Sand: fine to medium sand with abundant comminuted shell thickly interbedded with fine sand with scattered shell fragments; fine sand/silt nodules.
SG/NR:
Sf: dark brown gray very fine sand; scattered plant fibers; dispersed shell.
SG/NR:
Zs: dark gray very fine sand to silt.
Zm: dark gray slightly sandy silt.
SG/NR:
Glass
3.0
3.0
11.0
Number of objects per cubic foot
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-3		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
1893	wharf adjacent to a vacant building (1893 Sanborn map)	wharf planks
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Railroad Avenue between Northern Pacific RR main tracks on trestles (1904-1905 Sanborn map)	debris falling from RR trestles
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles (1916 Sanborn map)	planking; piles
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

AH-04

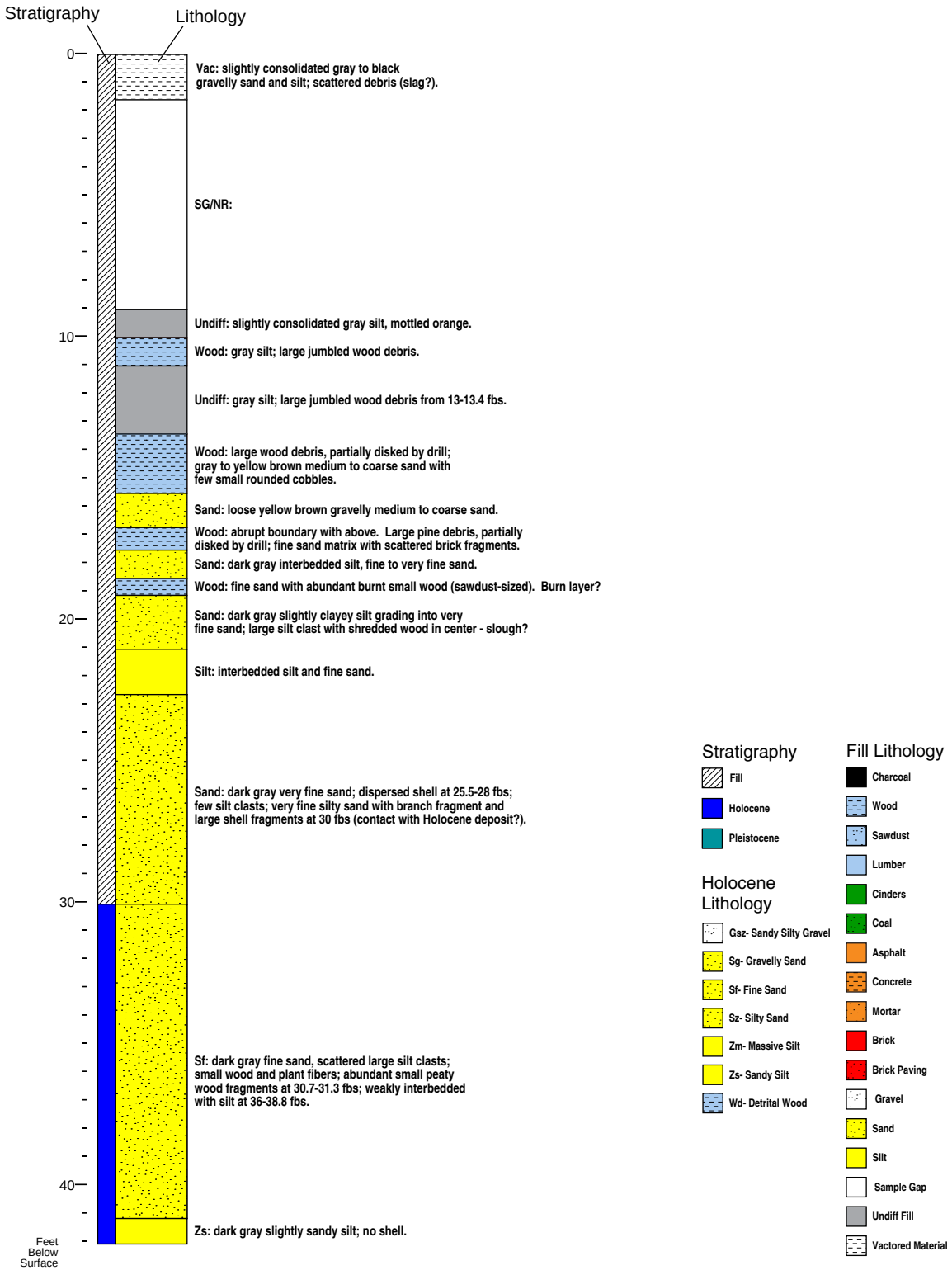

Stratigraphy
Lithology
0
10
20
30
40
Feet Below Surface
Vac: concrete; roadbase.
Vac: slightly consolidated gray brown sandy gravelly silt; dispersed brick, slag.
Silt: slightly consolidated gray clayey silt with small pebbles.
Wood: large disked wood debris scattered in silty matrix.
Undiff: loose yellow brown silty to coarse sandy pebbles; scattered small to medium wood from 20-21f bs; large wood, fine sand and organic staining at 24 fbs.
SG/NR:
Sand: dark gray fine sand, few silt clasts, dispersed comminuted shell.
Sz: dark gray silty fine sand; fines downward; dispersed small wood and plant fibers.
Zs: dark gray silt with very fine sand.
Glass
3.0
3.0
Ceramic
3.0
Number of objects per cubic foot
16.6
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-4		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
1893	stable south of Norman Street (1893 Sanborn map)	stable debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Northern Pacific RR main tracks on trestles on Railroad Avenue (1904-1905 Sanborn map)	debris falling from RR trestles
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles adjacent to Seattle Construction & Dry Dock Co.'s Machinery Storage and Repair building (1916 Sanborn map)	planking; piles; dock debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

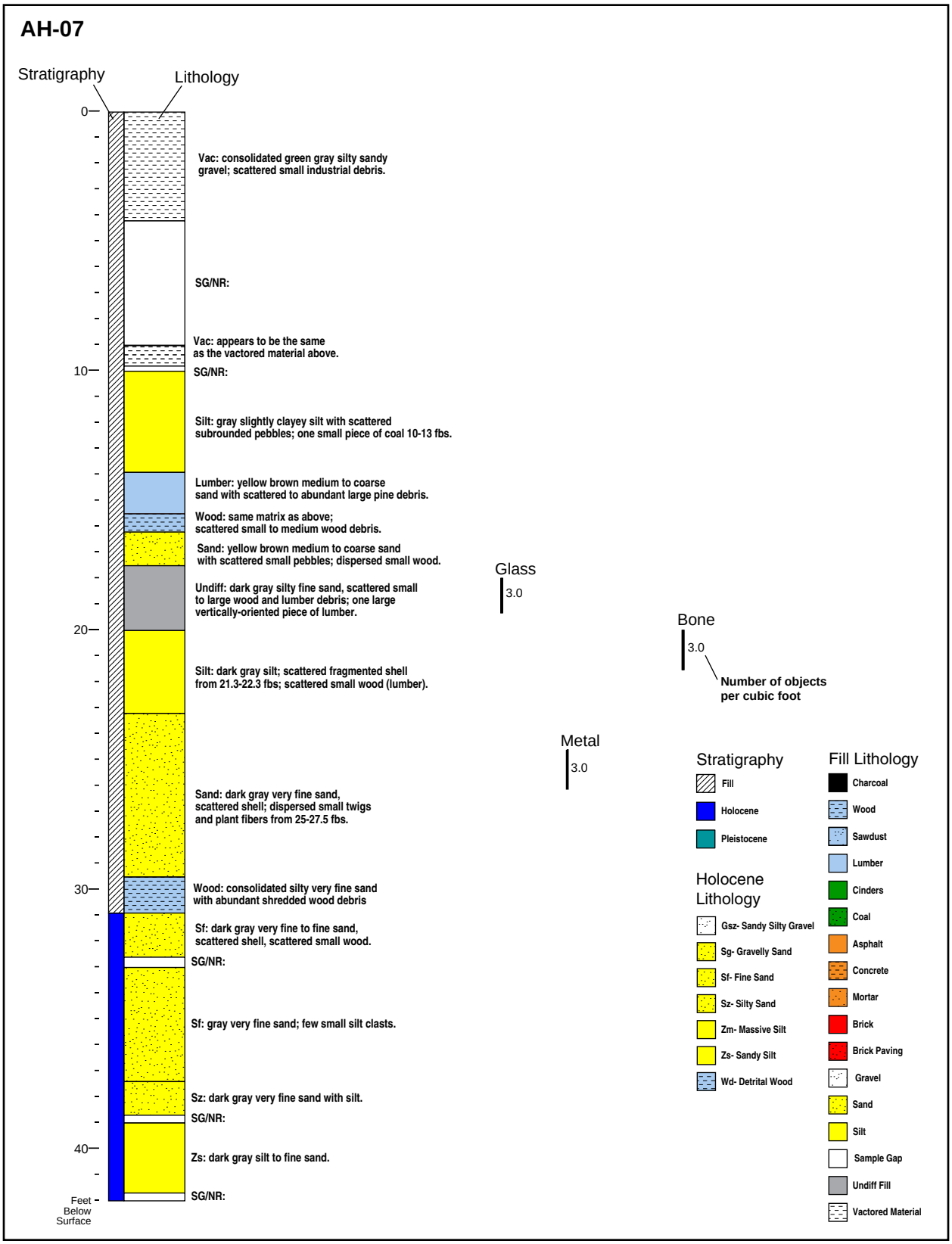

AH-05
Stratigraphy
Lithology
0
10
20
30
40
Feet Below Surface
Vac: concrete
Vac: gray silty matrix, large lumber debris (pine).
Vac: pine, partially stacked lumber with max thickness of 1.5'; gray silt matrix.
Vac: slightly consolidated gray silt, scattered rounded pebbles, scattered lumber.
Wood: solid wood, cored by drill.
SG/NR:
Lumber: solid wood to 11 fbs, then semi-vertical large piece lumber.
Undiff: gray slightly sandy mud.
Sand: dark gray slightly muddy medium to coarse sand.
Sand: gray gravelly slightly muddy coarse sand.
Wood: abundant wood debris; black brown sand/silt matrix.
Sand: dark gray very fine clean sand; scattered milled wood.
Lumber: lumber and wood debris; black organic-rich sand/silt matrix; scattered shell; dispersed faunal remain
SG/NR:
Sand: dark gray fine sand with scattered very coarse sand and rounded pebbles. Dispersed comminuted shell. Scattered glass, mortar, ceramics, faunal remains.
Sand: dark gray fine to medium sand; scattered shell (some whole); scattered glass, wood debris.
Sand: dark gray silty fine sand; scattered very fine wood debris and organic material; green glass shard.
Sand: dark gray silty fine sand; scattered small wood; possible slough; methane-like odor.
SG/NR:
Sf: dark gray slightly silty fine sand, slightly organic; scattered small wood, twigs, trace of organic material; weakly interbedded from 35-38 fbs.
Sz: fines downward; fine to very fine silty sand; dispersed fine shell fragments.
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material
Glass
6.0
3.0
6.0
Ceramic
24.9
168.0
192.0
153.0
69.0
3.0
29.4
12.0
3.0
Metal
24.0
6.0
24.0
6.0
4.2
Number of objects per cubic foot
Bone
87.4
57.0
15.0

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-5		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats adjacent to tidal channel (1875 t-sheet)	undisturbed sand and silt; weirs
1893	Norman Street on piles adjacent to flask yard (1893 Sanborn map)	planking; piles; wood; sand; coke
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Northern Pacific RR main tracks on trestles on Railroad Avenue (1904-1905 Sanborn map)	debris falling from RR trestles
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles, CM&StP RY / OWRR&N Co. tracks (1916 Sanborn map)	debris from RR
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

AH-06

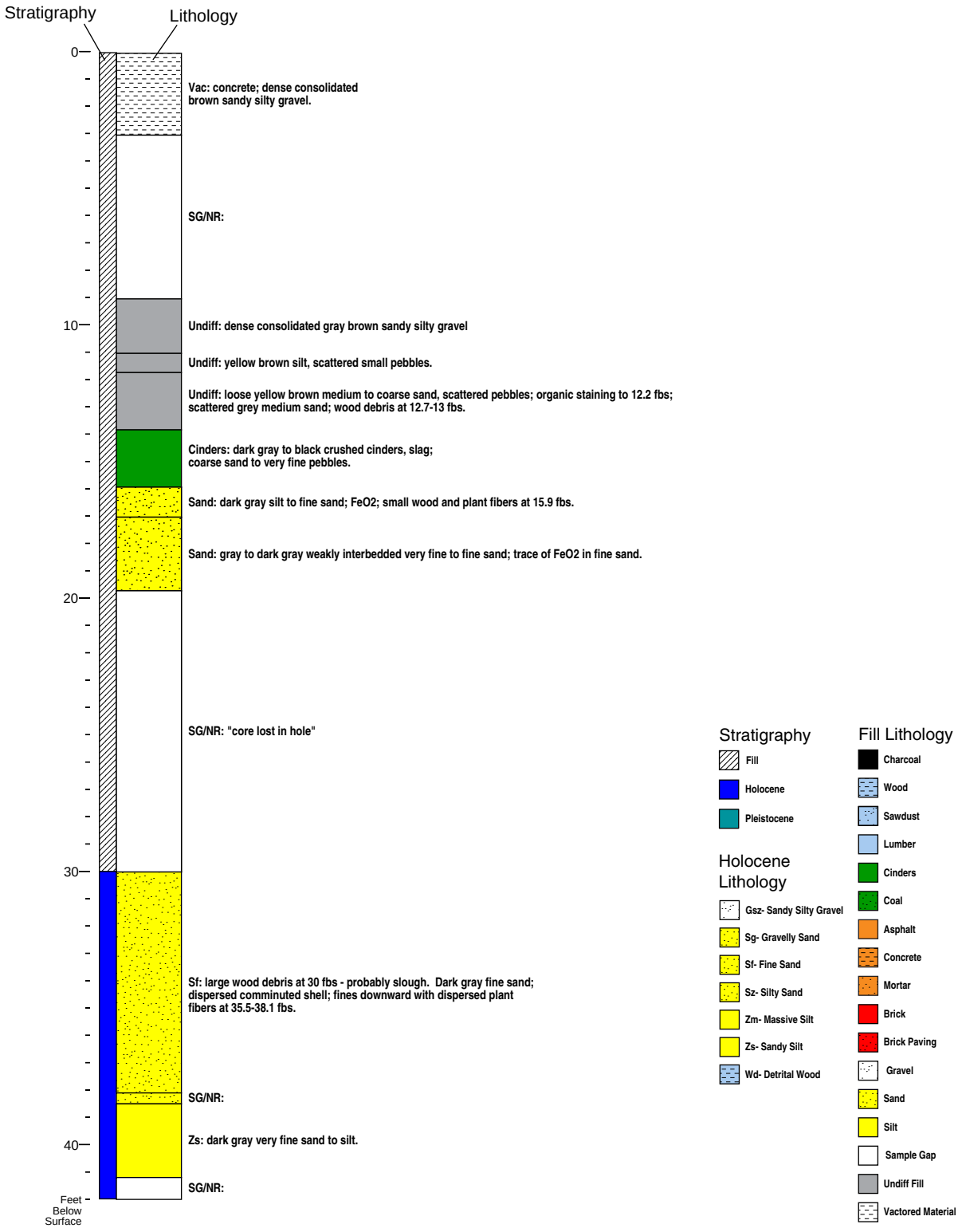

Stratigraphy
Lithology
0
10
20
30
40
Feet Below Surface
Vac: slightly consolidated gray to black gravelly sand and silt; scattered debris (slag?).
SG/NR:
Undiff: slightly consolidated gray silt, mottled orange.
Wood: gray silt; large jumbled wood debris.
Undiff: gray silt; large jumbled wood debris from 13-13.4 fbs.
Wood: large wood debris, partially disked by drill; gray to yellow brown medium to coarse sand with few small rounded cobbles.
Sand: loose yellow brown gravelly medium to coarse sand.
Wood: abrupt boundary with above. Large pine debris, partially disked by drill; fine sand matrix with scattered brick fragments.
Sand: dark gray interbedded silt, fine to very fine sand.
Wood: fine sand with abundant burnt small wood (sawdust-sized). Burn layer?
Sand: dark gray slightly clayey silt grading into very fine sand; large silt clast with shredded wood in center - slough?
Silt: interbedded silt and fine sand.
Sand: dark gray very fine sand; dispersed shell at 25.5-28 fbs; few silt clasts; very fine silty sand with branch fragment and large shell fragments at 30 fbs (contact with Holocene deposit?).
Sf: dark gray fine sand, scattered large silt clasts; small wood and plant fibers; abundant small peaty wood fragments at 30.7-31.3 fbs; weakly interbedded with silt at 36-38.8 fbs.
Zs: dark gray slightly sandy silt; no shell.
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-6		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats adjacent to tidal channel (1875 t-sheet)	undisturbed sand and silt; weirs
1893	Seattle Terminal RR tracks in a flask yard on piles (1893 Sanborn map)	wharf planks; coke; wood; sand; debris from RR; clinker; slag
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Northern Pacific RR main tracks on trestles on Railroad Avenue (1904-1905 Sanborn map)	debris falling from RR trestles
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles adjacent to Seattle Construction & Dry Dock Co.'s Boiler Shop (1916 Sanborn map)	planking; piles; dock debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris


AH-07
Stratigraphy
Lithology
0
10
20
30
40
Feet Below Surface
Vac: consolidated green gray silty sandy gravel; scattered small industrial debris.
SG/NR:
Vac: appears to be the same as the vactored material above.
SG/NR:
Silt: gray slightly clayey silt with scattered subrounded pebbles; one small piece of coal 10-13 fbs.
Lumber: yellow brown medium to coarse sand with scattered to abundant large pine debris.
Wood: same matrix as above; scattered small to medium wood debris.
Sand: yellow brown medium to coarse sand with scattered small pebbles; dispersed small wood.
Undiff: dark gray silty fine sand, scattered small to large wood and lumber debris; one large vertically-oriented piece of lumber.
Silt: dark gray silt; scattered fragmented shell from 21.3-22.3 fbs; scattered small wood (lumber).
Sand: dark gray very fine sand, scattered shell; dispersed small twigs and plant fibers from 25-27.5 fbs.
Wood: consolidated silty very fine sand with abundant shredded wood debris
Sf: dark gray very fine to fine sand, scattered shell, scattered small wood.
SG/NR:
Sf: gray very fine sand; few small silt clasts.
Sz: dark gray very fine sand with silt.
SG/NR:
Zs: dark gray silt to fine sand.
SG/NR:
Glass
3.0
Bone
3.0
Number of objects per cubic foot
Metal
3.0
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

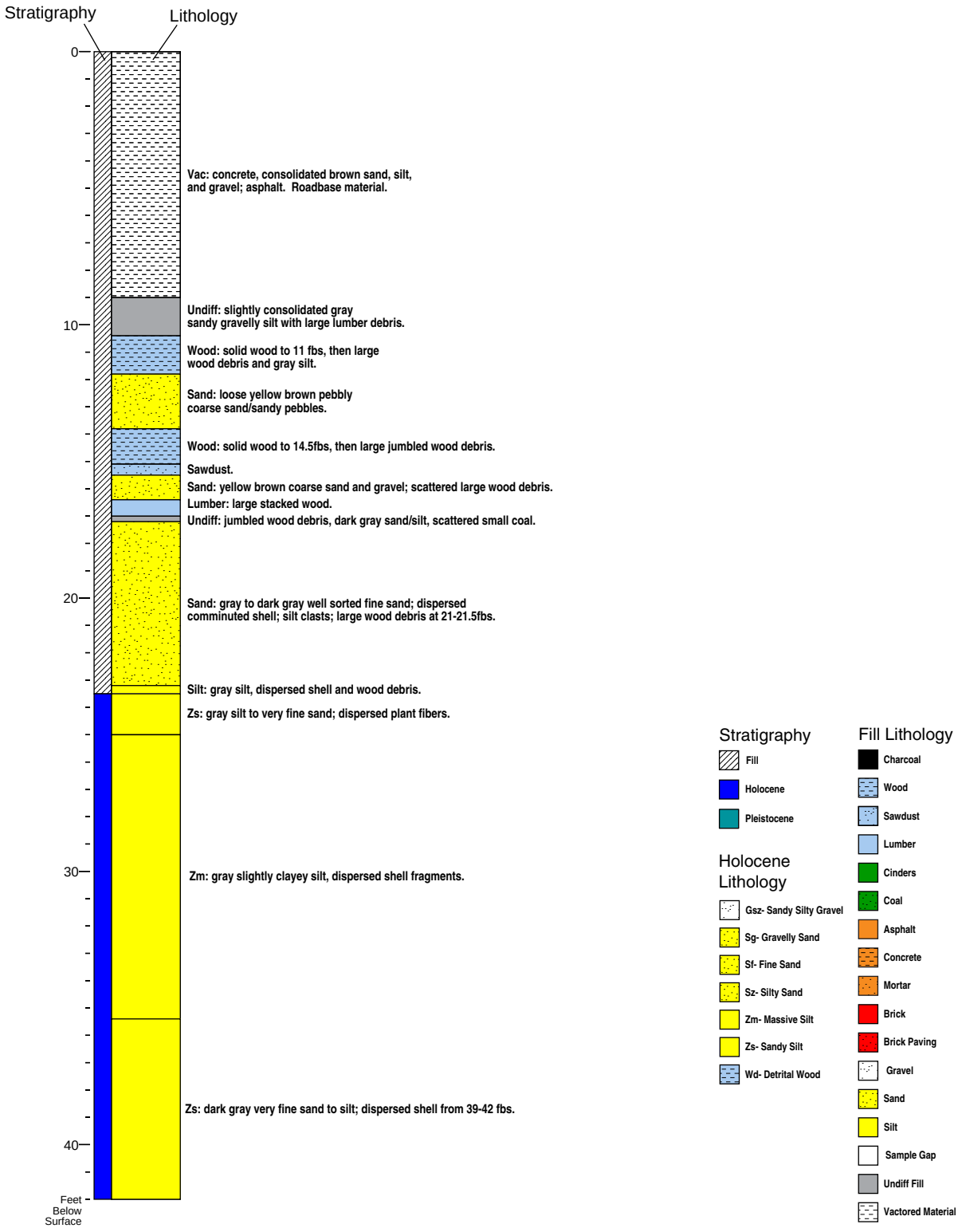
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-7		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
1893	Seattle Terminal RR tracks in a flask yard on piles (1893 Sanborn map)	wharf planks; coke; wood; sand; debris from RR
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Northern Pacific RR main tracks on trestles adjacent Moran Bros. Co.'s shed for building steel ships (1904-1905 Sanborn map)	debris falling from RR trestles; ship building debris
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles adjacent to Seattle Construction & Dry Dock Co.'s unnamed structure (same plan as Moran Bros. Steel ship shed) (1916 Sanborn map)	planking; piles; dock debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

AH-08

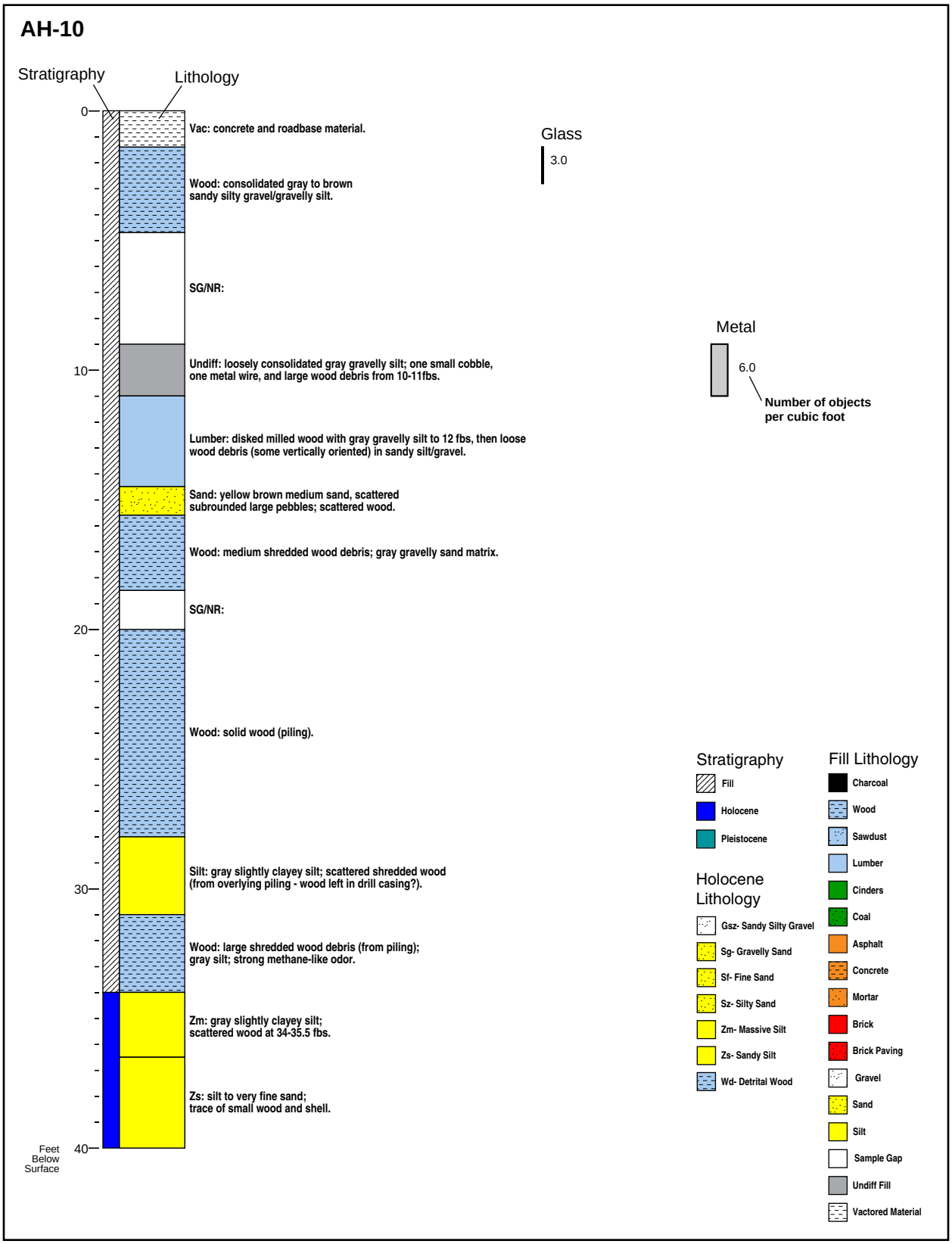

Stratigraphy
Lithology
0
10
20
30
40
Feet Below Surface
Vac: concrete; dense consolidated brown sandy silty gravel.
SG/NR:
Undiff: dense consolidated gray brown sandy silty gravel
Undiff: yellow brown silt, scattered small pebbles.
Undiff: loose yellow brown medium to coarse sand, scattered pebbles; organic staining to 12.2 fbs; scattered grey medium sand; wood debris at 12.7-13 fbs.
Cinders: dark gray to black crushed cinders, slag; coarse sand to very fine pebbles.
Sand: dark gray silt to fine sand; FeO2; small wood and plant fibers at 15.9 fbs.
Sand: gray to dark gray weakly interbedded very fine to fine sand; trace of FeO2 in fine sand.
SG/NR: "core lost in hole"
Sf: large wood debris at 30 fbs - probably slough. Dark gray fine sand; dispersed comminuted shell; fines downward with dispersed plant fibers at 35.5-38.1 fbs.
SG/NR:
Zs: dark gray very fine sand to silt.
SG/NR:
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-8		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
1893	Plummer Street on piles between Seattle Terminal RR tracks and the Moran Bros. Co.'s Foundry (1893 Sanborn map)	planking; piles; RR debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Northern Pacific RR main tracks on trestles adjacent to Lumber Shed on Moran Bros. Co.'s Ship Yard (1904-1905 Sanborn map)	debris falling from RR trestles; milled wood
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles adjacent to Seattle Construction & Dry Dock Co.'s Foundry (1916 Sanborn map)	planking; piles; dock debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

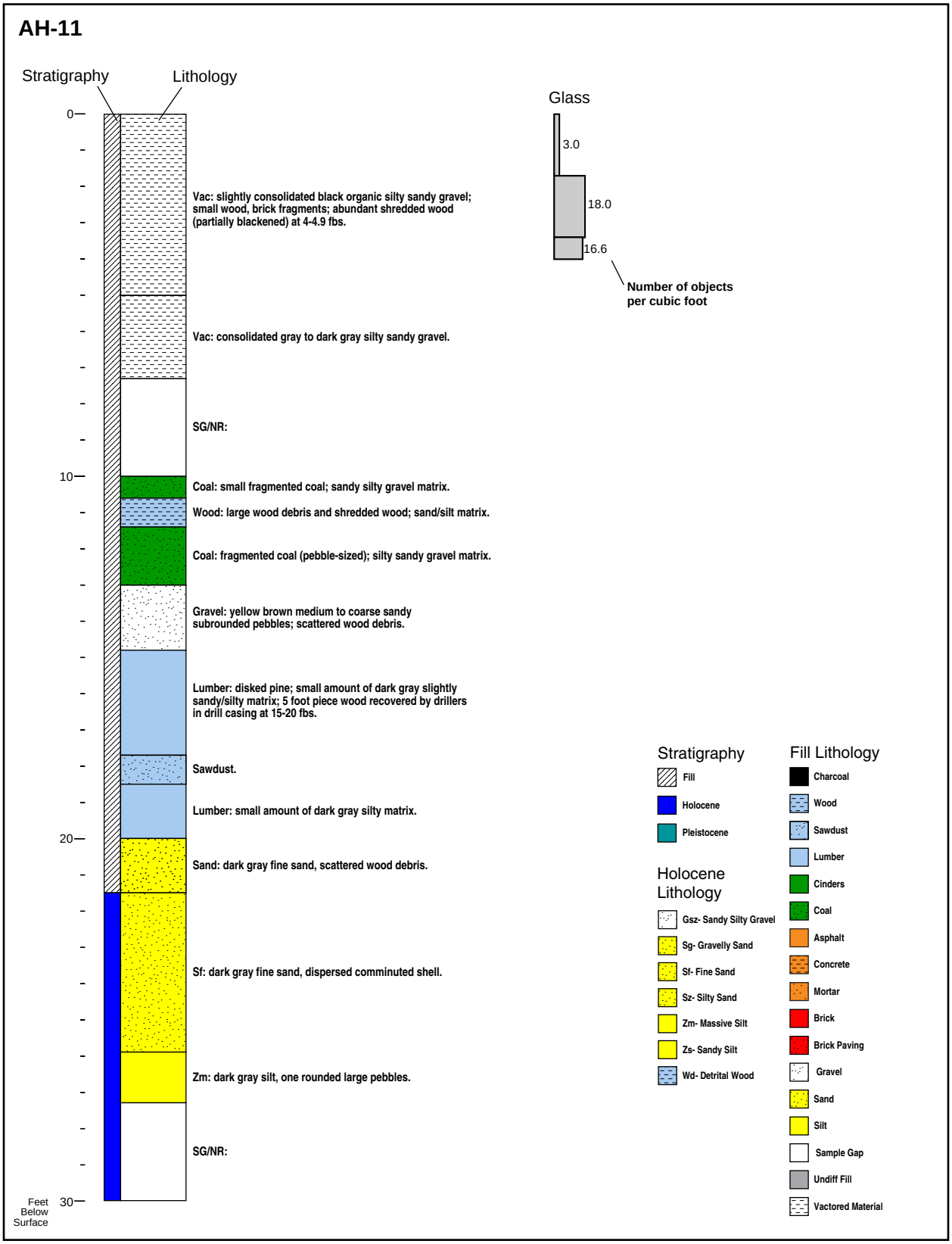
AH-09


Stratigraphy
Lithology
0
10
20
30
40
Feet Below Surface
Vac: concrete, consolidated brown sand, silt, and gravel; asphalt. Roadbase material.
Undiff: slightly consolidated gray sandy gravelly silt with large lumber debris.
Wood: solid wood to 11 fbs, then large wood debris and gray silt.
Sand: loose yellow brown pebbly coarse sand/sandy pebbles.
Wood: solid wood to 14.5fbs, then large jumbled wood debris.
Sawdust.
Sand: yellow brown coarse sand and gravel; scattered large wood debris.
Lumber: large stacked wood.
Undiff: jumbled wood debris, dark gray sand/silt, scattered small coal.
Sand: gray to dark gray well sorted fine sand; dispersed comminuted shell; silt clasts; large wood debris at 21-21.5fbs.
Silt: gray silt, dispersed shell and wood debris.
Zs: gray silt to very fine sand; dispersed plant fibers.
Zm: gray slightly clayey silt, dispersed shell fragments.
Zs: dark gray very fine sand to silt; dispersed shell from 39-42 fbs.
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-9		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
1893	Moran Bros. Co. Machine Shop (1893 Sanborn map)	wharf planks; shop debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Northern Pacific RR main tracks on trestles adjacent to Lumber Storage building on Moran Bros. Co.'s Ship Yard (1904-1905 Sanborn map)	debris falling from RR trestles; milled wood
1908	photos from this year show Moran Bros. Ship Yard in the vicinity of Railroad Avenue and Charles Street, there are several ships moored along long narrow wooden wharves high above Elliott Bay on piles (little evidence of filling)	planking; piles; ship building debris
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles adjacent to Seattle Construction & Dry Dock Co.'s Foundry (1916 Sanborn map)	planking; piles; dock debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

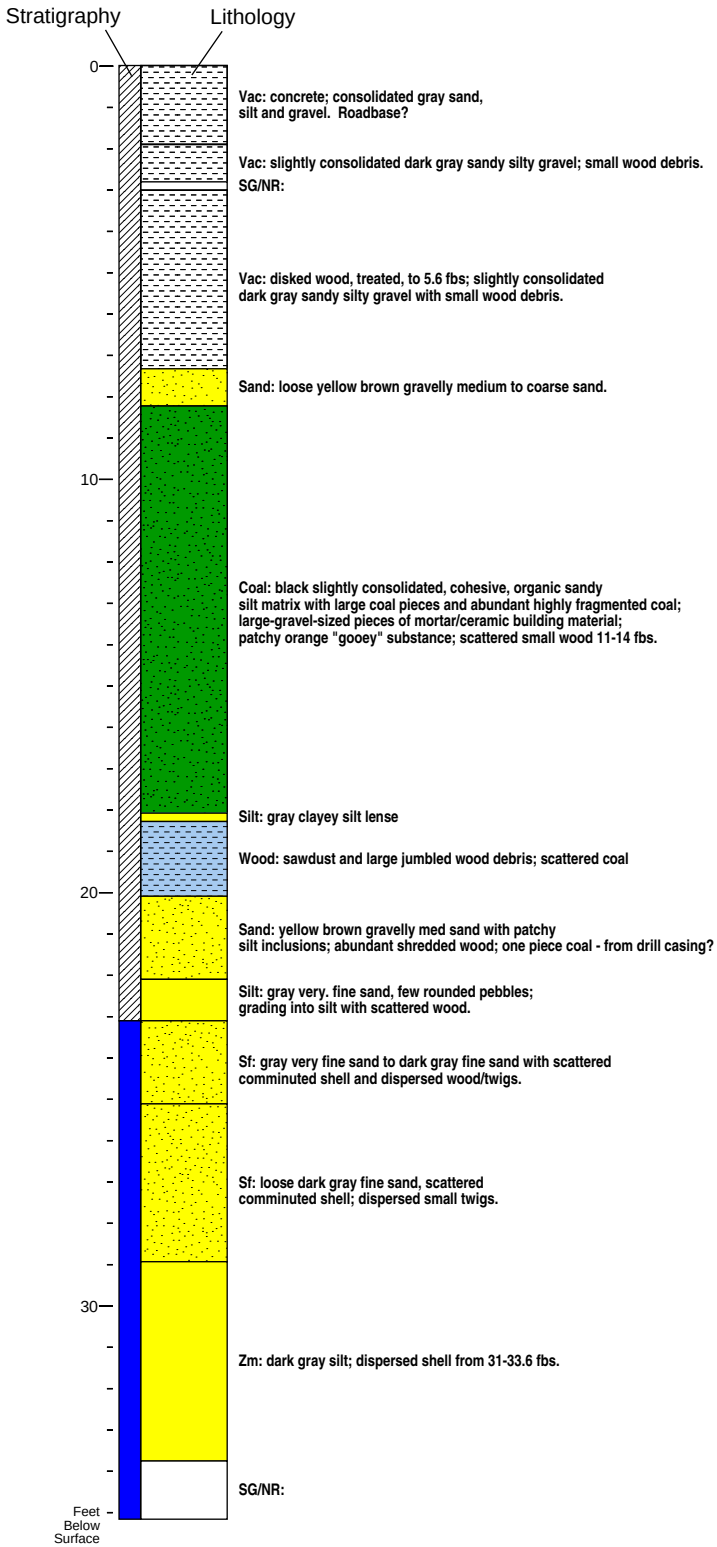

AH-10
Stratigraphy
Lithology
0
10
20
30
40
Feet Below Surface
Vac: concrete and roadbase material.
Wood: consolidated gray to brown sandy silty gravel/gravelly silt.
SG/NR:
Undiff: loosely consolidated gray gravelly silt; one small cobble, one metal wire, and large wood debris from 10-11fbs.
Lumber: disked milled wood with gray gravelly silt to 12 fbs, then loose wood debris (some vertically oriented) in sandy silt/gravel.
Sand: yellow brown medium sand, scattered subrounded large pebbles; scattered wood.
Wood: medium shredded wood debris; gray gravelly sand matrix.
SG/NR:
Wood: solid wood (piling).
Silt: gray slightly clayey silt; scattered shredded wood (from overlying piling - wood left in drill casing?).
Wood: large shredded wood debris (from piling); gray silt; strong methane-like odor.
Zm: gray slightly clayey silt; scattered wood at 34-35.5 fbs.
Zs: silt to very fine sand; trace of small wood and shell.
Glass
3.0
Metal
6.0
Number of objects per cubic foot
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-10		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats (1875 t-sheet)	undisturbed sand and silt
1893	Moran Bros. Co. Pipe Shop (1893 Sanborn map)	wharf planks; shop debris
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Coke and Flask Shed on Moran Bros. Ship Yard (1904-1905 Sanborn map)	coke; wood; sand; ship manufacture debris
1908	photos from this year show Moran Bros. Ship Yard in the vicinity of Railroad Avenue and Charles Street, there are several ships moored along long narrow wooden wharves high above Elliott Bay on piles (little evidence of filling)	planking; piles; ship building debris
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles adjacent to Seattle Construction & Dry Dock Co.'s Foundry (1916 Sanborn map)	planking; piles; dock debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris


AH-11
Stratigraphy
Lithology
0
10
20
30
Feet Below Surface
Vac: slightly consolidated black organic silty sandy gravel; small wood, brick fragments; abundant shredded wood (partially blackened) at 4-4.9 fbs.
Vac: consolidated gray to dark gray silty sandy gravel.
SG/NR:
Coal: small fragmented coal; sandy silty gravel matrix.
Wood: large wood debris and shredded wood; sand/silt matrix.
Coal: fragmented coal (pebble-sized); silty sandy gravel matrix.
Gravel: yellow brown medium to coarse sandy subrounded pebbles; scattered wood debris.
Lumber: disked pine; small amount of dark gray slightly sandy/silty matrix; 5 foot piece wood recovered by drillers in drill casing at 15-20 fbs.
Sawdust.
Lumber: small amount of dark gray silty matrix.
Sand: dark gray fine sand, scattered wood debris.
Sf: dark gray fine sand, dispersed comminuted shell.
Zm: dark gray silt, one rounded large pebbles.
SG/NR:
Glass
3.0
18.0
16.6
Number of objects per cubic foot
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

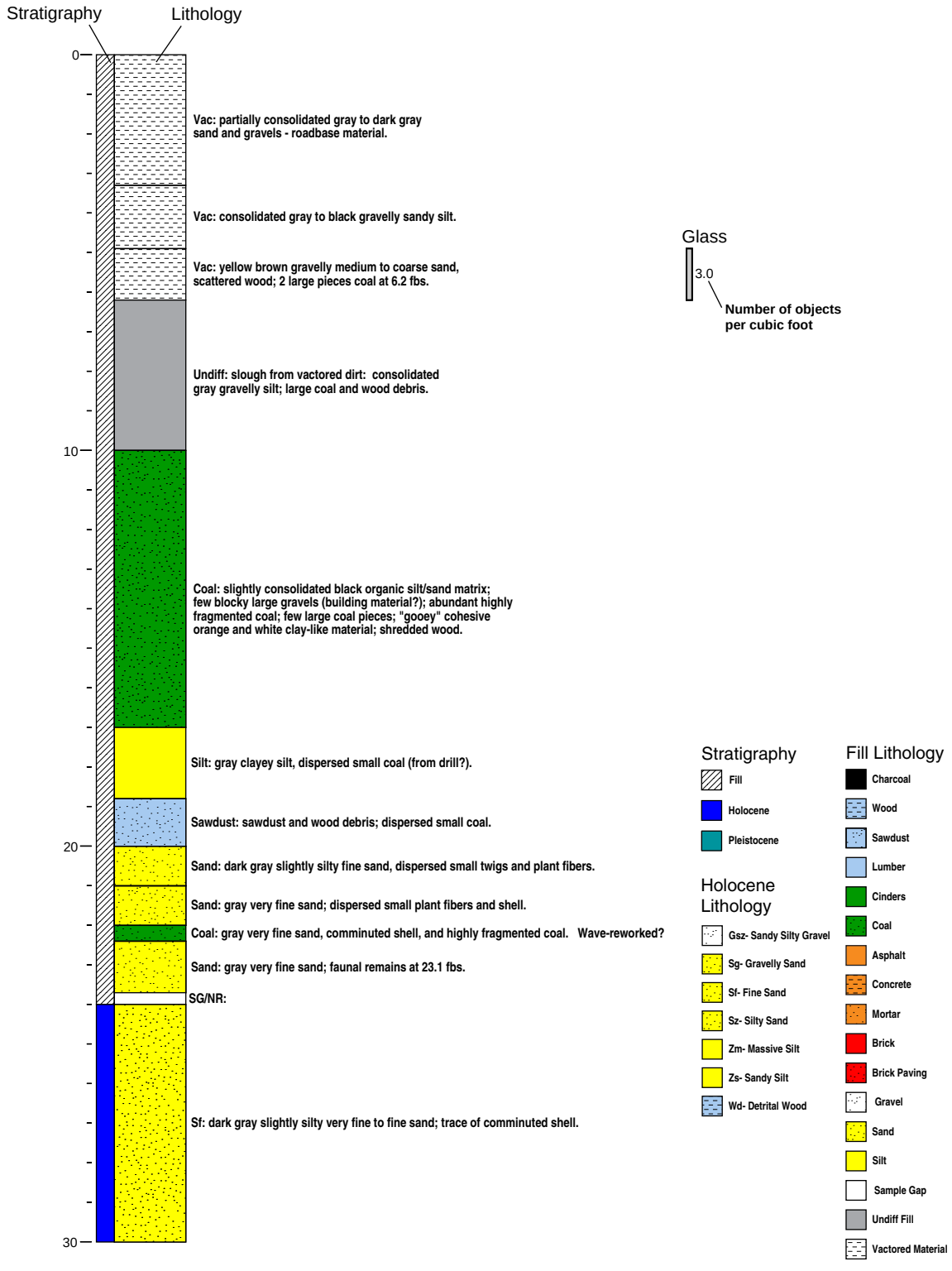
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-11		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats adjacent to tidal channel (1875 t-sheet)	undisturbed sand and silt
1893	Charles Street above tide flats on piles (1893 Sanborn map)	planking; piles
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Northern Pacific RR main tracks on trestles adjacent to Coke and Flask Shed on Moran Bros. Ship Yard (1904-1905 Sanborn map)	RR debris; coke; wood; sand; ship manufacture debris
1908	photos from this year show Moran Bros. Ship Yard in the vicinity of Railroad Avenue and Charles Street, there are several ships moored along long narrow wooden wharves high above Elliott Bay on piles (little evidence of filling)	planking; piles; ship building debris
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles adjacent to the US Government Inspection Office on the Seattle Construction & Dry Dock Co.'s Ship Yard (1916 Sanborn map)	planking; piles; dock debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

AH-12


Stratigraphy
Lithology
0
10
20
30
Feet Below Surface
Vac: concrete; consolidated gray sand, silt and gravel. Roadbase?
Vac: slightly consolidated dark gray sandy silty gravel; small wood debris.
SG/NR:
Vac: disked wood, treated, to 5.6 fbs; slightly consolidated dark gray sandy silty gravel with small wood debris.
Sand: loose yellow brown gravelly medium to coarse sand.
Coal: black slightly consolidated, cohesive, organic sandy silt matrix with large coal pieces and abundant highly fragmented coal; large-gravel-sized pieces of mortar/ceramic building material; patchy orange "gooey" substance; scattered small wood 11-14 fbs.
Silt: gray clayey silt lense
Wood: sawdust and large jumbled wood debris; scattered coal
Sand: yellow brown gravelly med sand with patchy silt inclusions; abundant shredded wood; one piece coal - from drill casing?
Silt: gray very. fine sand, few rounded pebbles; grading into silt with scattered wood.
Sf: gray very fine sand to dark gray fine sand with scattered comminuted shell and dispersed wood/twigs.
Sf: loose dark gray fine sand, scattered comminuted shell; dispersed small twigs.
Zm: dark gray silt; dispersed shell from 31-33.6 fbs.
SG/NR:
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

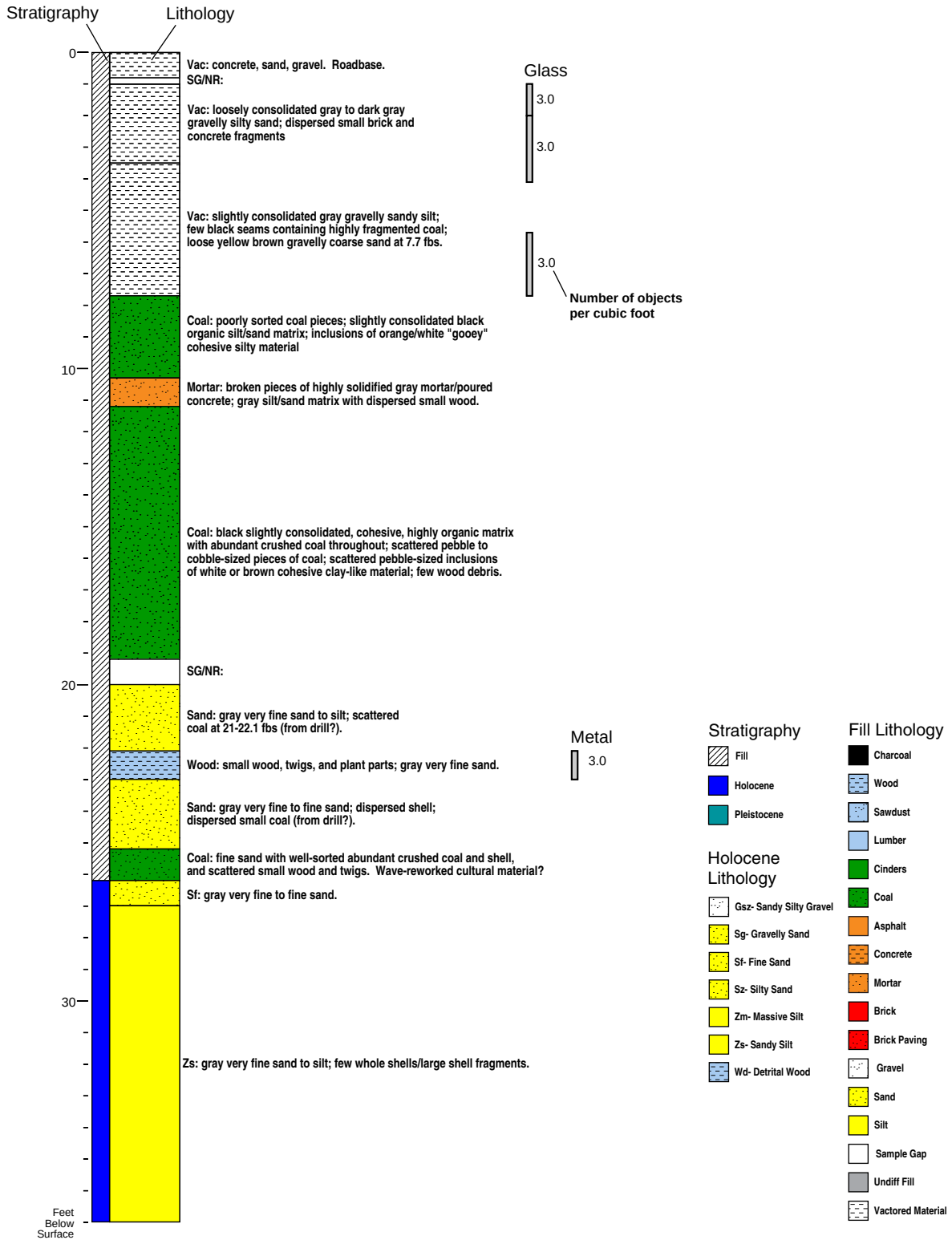
DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-12		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats adjacent to tidal channel (1875 t-sheet)	undisturbed sand and silt
1893	wharf adjacent to Seattle Terminal RR tracks (1893 Sanborn map)	wharf planks; debris from RR falling off trestle
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Northern Pacific RR main tracks on trestles adjacent to long, narrow wharf to the north of Moran Bros. Ship Yard (1904-1905 Sanborn map)	debris falling from RR trestles
1908	photos from this year show Moran Bros. Ship Yard in the vicinity of Railroad Avenue and Charles Street, there are several ships moored along long narrow wooden wharves high above Elliott Bay on piles (little evidence of filling)	planking; piles; ship building debris
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles, OWRR&N Co. tracks accessing long, narrow wharf (1916 Sanborn map)	planking; piles; RR debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

AH-13


Stratigraphy
Lithology
0
10
20
30
Vac: partially consolidated gray to dark gray sand and gravels - roadbase material.
Vac: consolidated gray to black gravelly sandy silt.
Vac: yellow brown gravelly medium to coarse sand, scattered wood; 2 large pieces coal at 6.2 fbs.
Undiff: slough from vactored dirt: consolidated gray gravelly silt; large coal and wood debris.
Coal: slightly consolidated black organic silt/sand matrix; few blocky large gravels (building material?); abundant highly fragmented coal; few large coal pieces; "gooey" cohesive orange and white clay-like material; shredded wood.
Silt: gray clayey silt, dispersed small coal (from drill?).
Sawdust: sawdust and wood debris; dispersed small coal.
Sand: dark gray slightly silty fine sand, dispersed small twigs and plant fibers.
Sand: gray very fine sand; dispersed small plant fibers and shell.
Coal: gray very fine sand, comminuted shell, and highly fragmented coal. Wave-reworked?
Sand: gray very fine sand; faunal remains at 23.1 fbs.
SG/NR:
Sf: dark gray slightly silty very fine to fine sand; trace of comminuted shell.
Glass
3.0
Number of objects per cubic foot
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-13		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	tide flats adjacent to Elliott Bay (1875 t-sheet)	undisturbed sand and silt
1893	Seattle Terminal RR tracks on trestles above tide flats (1893 Sanborn map)	sand and silt; debris from RR falling off trestle
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	intersection of Northern Pacific RR main tracks on trestles and tracks accessing a long, narrow wharf (1904-1905 Sanborn map)	debris falling from RR trestles
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles adjacent to tracks accessing PCRR's long, narrow wharf (1916 Sanborn map)	planking; piles; RR debris
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris

AH-14


Stratigraphy
Lithology
0
10
20
30
Feet Below Surface
Vac: concrete, sand, gravel. Roadbase.
SG/NR:
Vac: loosely consolidated gray to dark gray gravelly silty sand; dispersed small brick and concrete fragments
Vac: slightly consolidated gray gravelly sandy silt; few black seams containing highly fragmented coal; loose yellow brown gravelly coarse sand at 7.7 fbs.
Coal: poorly sorted coal pieces; slightly consolidated black organic silt/sand matrix; inclusions of orange/white "gooey" cohesive silty material
Mortar: broken pieces of highly solidified gray mortar/poured concrete; gray silt/sand matrix with dispersed small wood.
Coal: black slightly consolidated, cohesive, highly organic matrix with abundant crushed coal throughout; scattered pebble to cobble-sized pieces of coal; scattered pebble-sized inclusions of white or brown cohesive clay-like material; few wood debris.
SG/NR:
Sand: gray very fine sand to silt; scattered coal at 21-22.1 fbs (from drill?).
Wood: small wood, twigs, and plant parts; gray very fine sand.
Sand: gray very fine to fine sand; dispersed shell; dispersed small coal (from drill?).
Coal: fine sand with well-sorted abundant crushed coal and shell, and scattered small wood and twigs. Wave-reworked cultural material?
Sf: gray very fine to fine sand.
Zs: gray very fine sand to silt; few whole shells/large shell fragments.
Glass
3.0
3.0
3.0
Number of objects per cubic foot
Metal
3.0
Stratigraphy
Fill
Holocene
Pleistocene
Holocene Lithology
Gsz- Sandy Silty Gravel
Sg- Gravelly Sand
Sf- Fine Sand
Sz- Silty Sand
Zm- Massive Silt
Zs- Sandy Silt
Wd- Detrital Wood
Fill Lithology
Charcoal
Wood
Sawdust
Lumber
Cinders
Coal
Asphalt
Concrete
Mortar
Brick
Brick Paving
Gravel
Sand
Silt
Sample Gap
Undiff Fill
Vactored Material

DATE	DOCUMENTED TIMELINE	EXPECTED ARCHAEOLOGICAL CORRELATES
AH-14		
Constant	promiscuous dumping (Phelps 1978)	flotsam; jetsam; residential debris
1875	in Elliott Bay adjacent to tide flats (1875 t-sheet)	undisturbed sand and silt
1893	Seattle Terminal RR tracks on trestles above tide flats (1893 Sanborn map)	sand and silt; debris from RR falling off trestle
1895-1905	dredge spoils from E and W Waterway (straightening the Duwamish) possibly used to fill area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1897	possibly used for municipal dumping (Seattle Municipal Archives)	rubbish; residential debris
1901-1904	South Canal project, sediments from the west side of Beacon Hill possibly in area (Benoit 1979)	dredge spoils: well-sorted sand or silt; little to no archaeological materials
1904	Northern Pacific RR main tracks on trestles adjacent to low ground yet to be filled between tracks and Pacific Coast Co.'s wharf (1904-1905 Sanborn map)	debris falling from RR trestles; fill
1907-1910	Jackson Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1909-1912	Dearborn Regrade, area near core possibly received hydraulic fill (Benoit 1979)	hydraulic fill: well-sorted sand and silt; little to no archaeological material
1916	Railroad Avenue on piles adjacent to tracks on trestles accessing Pacific Coast Co.'s round house (1916 Sanborn map)	planking; piles; debris falling from trestles
1933-1936	new seawall constructed, Railroad Avenue (present-day Alaskan Way) filled and then paved to Broad Street (Hershman et al. 1981)	fill; asphalt
1949	construction begins on the Alaskan Way Viaduct (NWAA 2007)	construction debris