



XL Insurance

Site redevelopment: understanding and managing environmental risks

An environmental
white paper

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Overview
Every community has at least one property with a perfect location that appears to be a prime piece of real estate, yet it has remained idle and unused for many years since the last business closed its doors. The reasons for stalled redevelopment can be diverse with complex legal issues involving the current owner or prior tenants being at the top of the list. Cost associated with known or potential environmental impacts is another critical factor as it can often be a significant roadblock to a real estate transaction or proposed redevelopment.

Pollution liability insurance coverage can be an important mechanism for transferring risk and easing concerns associated with a property sale and planned redevelopment; however, it is not a substitute for a comprehensive environmental site investigation and integrated remedial and construction plan. This paper examines the environmental risk factors and challenges that are often associated with redevelopment sites. It also presents contractual and risk management tools that can be employed to address environmental exposures. The conclusion provides actual claim scenarios that highlight the importance of understanding site characteristics, proposed work plans, and potential risks.

Site redevelopment activities are conducted for a multitude of purposes and present a variety of environmental risks for property owners, developers, and contractors. Maximizing site use and achieving urban renewal and revitalization objectives for vacant or distressed properties are often key goals of redevelopment projects. Redevelopment sites range from recreational use properties such as a former golf course to properties with a history of heavy industrial use. Future use may be of a similar nature, such as apartments being redeveloped into high-rise residential, or completely different, such as a vacant former industrial property being redeveloped as an urban in-fill site with mixed-use retail and residential.

Pollution liability risk factors

Historic site use, whether commercial or manufacturing, may include a brownfield component requiring a thorough understanding of environmental risks factored into the redevelopment strategy. Even sites with only historical agricultural use, such as an orchard, can present significant environmental exposures for redevelopment plans and intended site uses. The common risk factor is typically historical chemical use at the site, an adjacent site, or regionally that may have impacted soil, groundwater, or soil vapor. There may also be risks associated with existing on-site structures that contain hazardous building materials such as asbestos, lead-based paint, or other less common materials.

Failure to understand environmental risks during site redevelopment can result in unexpected costs, and result in construction delays, remediation expense, or bodily injury to site workers. This may cause significant changes to site development plans or abandonment of a project altogether. Significant legal defense expense can also be incurred when unknown pollution conditions or contaminated underground structures/equipment

are discovered during redevelopment as stakeholders dispute cleanup responsibility and additional human health risks are identified. Depending on the number of responsible parties involved, adequacy of site investigation work completed, and the strength of indemnities and contractual agreements, expenses can quickly escalate for buyers, sellers, and developers.

Developers and contractors also must contend with site preparation and construction operational environmental risks that could result from improper management of contaminated stormwater, excavation dewatering, soils, and airborne dust. These issues have the potential to result in third party bodily injury and property damage claims as well as result in regulatory agency action. Understanding site conditions and addressing contamination prior to redevelopment through proper investigation, remedial action, site work plans, and regulatory involvement can help avoid development delays, assist with appropriate site use selection, and allow for a thoughtful construction strategy.

Redevelopment environmental exposures

Technical factors increasing redevelopment environmental risks include the following:

Understanding historic use

Historic use often dictates the potential environmental risks that may be present at a site. Uncertainty regarding historic site uses presents an increased risk of discovering contamination during redevelopment. Additionally, sites with a history of multiple industrial occupants present an increased redevelopment risk due to unknowns associated with past operational practices, chemical use, waste management, and spills/releases. Completion of a Phase I Environmental Site Assessment (ESA) and subsequent subsurface investigation(s) are key steps in identifying and defining environmental conditions.

Chemical use by industry has evolved over the years as companies have identified and used less harmful chemicals. These changes have typically been driven by more stringent environmental,

health, and safety regulations as well as the voluntary adoption of environmental stewardship practices among industries or individual site owners. Substances such as DDT, hexavalent chromium, PCBs, asbestos, and many chlorinated solvents are now either banned or impractical for use due to more stringent regulations. However, these chemicals may be present in soil, groundwater, and soil vapor associated with historic use and may require remediation to meet planned future site use criteria.

Similarly, historical operational practices that were once acceptable, including air and wastewater discharges subject to regulatory agency permits or grandfathered under current regulations, may have resulted in environmental impacts. Poor chemical storage and housekeeping practices that were once acceptable may also have caused incremental impacts over a long period.

Historic site operations that are now well understood to represent potential contamination sources (vapor degreasing, dry cleaning, electroplating, etc.) may simply not have been

considered environmental and human health risks years ago. Site contamination may have also resulted from the use of previously unregulated site components such as septic fields, oil-water separators, on-site disposal or historic fill areas, retention basins/lagoons, underground storage tanks, and other in-ground features. Redevelopment activities have a high potential for discovery of unknown site features and environmental impacts.

Maturity of investigations

Sites that are in the initial stages of investigation present an elevated environmental risk due to uncertainty about site impacts and future requirements for mitigating environmental risk. Examples include sites involved in the early phases of discovery or sites that have identified contamination but have not fully delineated the extent of contamination (vertical extent, horizontal extent, offsite impacts, etc.). Brownfield and regulatory closure programs involve multiple steps completed in an approved succession to achieve closure. Discovery risks often decline the further a site progresses through regulatory closure programs.

However, redevelopment planning and financing take time and site conditions and construction plans may change. If a property transaction occurs during the site characterization process, a new owner may propose redevelopment plans and uses that are not supported by the previous or proposed site investigations. New regulatory approvals may be required, which can be contingent on more rigorous sampling programs, health-based risk assessments, remedial programs and institutional controls. Essentially, the more regulatory agency buy-in and/or oversight provided by a licensed agency surrogate as the site progresses through redevelopment planning, the more confident stakeholders can be that the project will not encounter environmental surprises.

Inadequate characterization

Failure to properly characterize a site prior to engaging in redevelopment activities may result in the discovery of unknown contaminants or additional areas of known contamination. It is important that a recent Phase I ESA be performed in accordance with accepted industry standards and that findings are appropriately considered during subsequent investigations. Any information gaps such as UST closure records or on-site waste generation history identified in a Phase I ESA should be addressed by follow-up research as needed. Lack of a quality Phase I ESA may result in missing recognized environmental conditions (RECs) and potential areas of environmental concern that warrant further subsurface investigation.

Developing an appropriate Phase II ESA strategy involves identifying contaminants of concern and potentially contaminated media. It is important to recognize whether existing or planned sampling is designed to be a limited, presence/absence type of investigation or whether it is intended to be a comprehensive investigation designed to delineate the vertical and areal extent of contamination and support creation of a remedial action workplan. Inadequate characterization may be the result of several circumstances including: too few investigation points, inappropriate sampling locations, or lack of appropriate media investigation (e.g., only soil analysis when groundwater or soil vapor investigations are also warranted).

Selection of appropriate laboratory chemical analysis for media samples is also critical. For example, sampling historic gasoline UST areas for volatile organics, but failing to test for additives such as lead or MTBE (depending on the age of a potential release) could be a serious oversight. Previous site investigations may not contemplate current or emerging contaminants such as 1,4-dioxane, perchlorate, and PFAS that are presently garnering regulatory attention. These types of analytical oversights can result in costly change orders, legal disputes, or claims during redevelopment.

The location and depth of site sampling points is of key importance. Soil borings placed in areas where contamination is not suspected, groundwater samples upgradient of suspected areas of contamination, and soil vapor samples collected away from source areas may artificially report “clean” site conditions. A common data gap stems from a lack of sampling under existing buildings/structures, either because it is deemed cost prohibitive, or the redevelopment plans include retaining the concrete slab without disturbing underlying soils.

Sampling locations may also be limited by the physical site layout (buildings/in-ground features) or legal restrictions (on- and off-site). Geophysical surveys may be necessary to account for underground features and utilities in areas that represent contaminant sources or could limit desired sampling locations. Further, investigation plans for sites with heterogeneous site geology and historic fill must also account for appropriate numbers and depths of sampling locations to obtain representative results.

Permission to access proposed sampling areas may need to be negotiated with current site owners or adjacent landowners. The legal ramifications of addressing unknown pollution discovery and associated regulatory agency reporting may

also need to be considered in advance. Sampling plans for redevelopment sites with concerns about contamination emanating from, or onto, an adjacent site that do not include property boundary or off-site sampling locations may not adequately identify actionable concerns.

Change of use

Redevelopment to a more restrictive site use such as industrial to residential often involves the application of more restrictive environmental regulatory standards. Many redevelopment strategies include a residential occupancy component as the highest, best use for a site that will deliver the maximum return on investment. Contaminant levels allowed to remain onsite in an industrial use scenario may not be allowed for a residential occupancy. Contaminant limits are specific to future use scenarios, so it is not unusual for significant differences in cleanup requirements between industrial, commercial, and residential uses. The residents of habitational occupancies have an increased exposure potential relative to industrial or commercial occupancies.

Reopener risk

Site owners that have previously received regulatory closure may be required to re-evaluate environmental risks under a redevelopment scenario. Regulatory closure such as a No Further Action (NFA) determination, a formal declaration by a regulatory agency that contaminants present onsite have been properly mitigated, may be re-evaluated or reopened during site redevelopment. This is common when contaminated media that were previously allowed to remain onsite will be disturbed during redevelopment. A common example would be a defined area of heavy metal contaminated soil beneath a building slab or parking lot that will be uncovered or addressed by new engineering controls proposed in the redevelopment plan.

Additional investigation or remediation may also be required if more restrictive clean-up standards currently apply to chemicals previously assigned NFA. Regulators may also require redevelopment sites to evaluate emerging chemicals not previously regulated when closure was assigned, or environmental exposure pathways not previously regulated such as vapor migration and intrusion. Further, liability protections granted under closure programs may not apply

to the planned future site use. Various institutional and engineering controls incorporated in the past to obtain NFAs such as impervious caps or groundwater use restrictions, may not be appropriate for proposed site uses and thus require new investigation/remediation.

Soil risks

Site redevelopment scenarios often involve soil grading and excavation along with the removal of historic site features such as previous building foundations and historic utilities. Visual evidence of contamination or odors indicating the presence of contamination may be discovered during these activities. Once discovered, contaminated soil requires characterization and consideration whether it is planned for re-use onsite, treatment onsite, or shipment offsite. Liability for impacts associated with exporting contaminated soil to a landfill or other non-owned disposal site can be considerable. Even soils characterized to meet nonhazardous or clean fill definitions at a site, may be subject to additional disposal site or third-party reuse analysis that can result in reclassification. This can have a significant impact on redevelopment costs and plans.

Urban fill, a form of anthropogenic (man-made) fill historically deposited to bring a site to grade, is frequently encountered in metropolitan areas. Urban fill presents a challenge to redevelopment sites as it may be comprised of a variety of metal, hydrocarbon, and/or semi-volatile organic contaminated media (construction debris, coal ash, wood ash, other solid waste material). Urban fill is typically heterogeneous and may exhibit varying degrees of contamination depending on where investigations are performed. Contaminant “hot-spots” or more isolated pockets of contaminants such as asbestos or polychlorinated biphenyls (PCBs) may also be present. In addition to Phase I ESAs, pre-construction geotechnical investigations can provide insight into whether urban fill or other subsurface



anomalies may be present. Also, creating and adhering to a Soil Management Plan (SMP) during redevelopment can assist site workers in properly managing potentially impacted soil when encountered during redevelopment.

Groundwater risks

Groundwater may be encountered at various depths during redevelopment activities and varies significantly depending on site location and geology. Contaminated groundwater may be confined or mobile and can transport or retain contaminants that have migrated down through the soil column. Depending on the contaminant characteristics, it may be found as free product floating on the water table or sinking to confining geologic structures below the water table. Contaminated groundwater almost always has a dissolved phase component, which may not reveal obvious visual or olfactory evidence during excavation.

In the event groundwater is present in the area where construction is planned, dewatering may be required to remove groundwater from excavated areas. Excavation groundwater typically requires some chemical analysis to determine how it must be appropriately managed. The discharge and/or treatment of contaminated groundwater must be properly permitted and managed as it presents a risk to human health and the environment. Actions to address contaminated groundwater may include active remediation (extraction and treatment) or the application of use restrictions to manage the risk in place (consumptive use and/or industrial use restrictions).

Further, because groundwater can retain hazardous constituents, it can serve as an on-going contaminant source of volatile organic compounds (VOCs) that present a vapor intrusion risk in on-site buildings. Groundwater can be the primary source of soil vapor contamination, despite soil constituents having been identified at acceptable concentrations. Understanding the vertical and lateral extent of groundwater impacts is important in ascertaining on- and off-site risks along with future use options for site groundwater.

Vapor intrusion risks

Sites with VOC contamination present an additional risk for site redevelopment. Vapor intrusion regulatory guidance and action levels are dynamic and have been a significant root cause of site reopeners. Vapor intrusion from contaminated soils and groundwater may require additional assessment and controls at redevelopment sites. Failure to adequately address vapor intrusion risks, both on- and off-site, can result in serious redevelopment delays and third-party claims.

In addition to site sampling, a human health-based risk assessment using models and other regulatory guidance are often needed to determine whether future building occupants will be at risk. Depending on these findings, additional source area remediation may be necessary, or vapor abatement designs may need to be incorporated into site buildings. This typically includes the installation of vapor barriers or active/passive ventilation systems in new construction or retrofit into existing buildings. Post-construction indoor air sampling may also be necessary to verify the effectiveness of such controls prior to obtaining a certificate of occupancy and/or may be required during occupancy to confirm the effectiveness of the mitigation system.

In addition to site sampling, a human health-based risk assessment using models and other regulatory guidance are often needed to determine whether future building occupants will be at risk.

Third-party risks

Risks to third parties during redevelopment include site workers and persons inhabiting offsite properties. Redevelopment activities can create exposure pathways for any contaminants still requiring remediation or engineering controls. This can include the generation of airborne particulates/dust or vapors from earthmoving activities. This can also include uncontrolled stormwater discharges from a construction site, whether contaminated with chemicals or containing soil/sediments (suspended solids). Nuisance exposures from odors or noise can also result in complaints/claims and result in regulatory agencies shutting down a job site or fines/penalties. Proper job site controls are needed to prevent off-site impacts.

Site construction workers need to be aware of contaminant risks and provided with appropriate personal protective equipment as per a site-specific health and safety plan. Site workers also need to take care to properly decontaminate their equipment and clothing to prevent transfer of contaminants offsite. Failure of site owners to make site workers aware of these risks can result in third party bodily injury claims.

Consultants and contractors engaged by site owners to provide environmental site assessment, remediation, and construction services at redevelopment sites can also be exposed to significant professional and pollution liabilities. If unknown contamination is discovered during site redevelopment, fingers may be pointed at inadequate investigation scopes of work or sampling protocols, with a focus on cost recovery associated with investigation, remediation, and project delays. This can result in legal liability expense for site owners, developers, consultants and contractors.

Hazardous building materials

Hazardous building materials include existing building components and equipment that present risk to human health

and the environment. These materials and equipment may include asbestos, mold, lead, mercury, polychlorinated biphenyls (PCB), chlorofluorocarbons, and radioactive sources. Disturbance of these materials, often during building demolition, without proper controls may result in exposure risks to site workers or future site occupants, project delays, and increased expenses from regulatory violations.

Structural assessments of existing buildings and ancillary equipment prior to site redevelopment are critical in the identification and management of hazardous building materials. Report findings allow the developer to plan for the costs to safely remove, segregate, and dispose of hazardous building materials and comply with specific local and state regulations.

Off-site risks

Off-site contamination not associated with historic onsite operations may impact redevelopment projects when impacted soil, groundwater, or soil vapor migrates onto the site. This may occur through natural pathways such as groundwater flow or through man-made conveyances such as utility lines that provide a conduit for contaminated media to follow.

Contamination from a neighboring property, where the source has been granted closure, may be discovered onsite if characterization failed to identify the extent of off-site conditions. Historic gas stations and drycleaners are common sources of such impacts given their use of chemicals that migrate quickly through soil and groundwater and present vapor intrusion risks. Sites can also be impacted by regional groundwater contamination sources from large-scale industrial releases or multiple industrial properties contributing to a comingled plume. Most of these risks should be identified through the completion of a Phase I ESA that identifies material threats from various sites around the redevelopment property.

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Contracts and risk transfer

Defining responsibilities for environmental conditions early in the redevelopment process is essential.

Purchase and sale agreements (PSAs) provide an opportunity for historic owners, current owners, purchasers and neighboring property owners to proactively negotiate responsibility for known and unknown environmental conditions prior to the sale of a property. They often detail available financial mechanisms, such as insurance, escrow accounts, as well as prior indemnification agreements, and explain how they will respond in the event contamination is identified during redevelopment. PSAs may also incorporate a contamination discovery period during active construction or extend it for some time thereafter.

Pollution liability insurance is a commonly used risk transfer mechanism in real estate transactions. Often, buyers and sellers of real estate seek coverage for the environmental risks that are insurable and transfer the risks they cannot insure to another

party. Contractual risk transfer is achieved via various legal contracts (including PSAs), which may involve multiple parties and legacy site owners. Pollution liability insurance can also protect against indemnification default risks, where a party fails to meet its contractual obligations to indemnify another party for costs related to environmental conditions. Involving legal counsel to provide a clear understanding of these and other risk transfer mechanisms is paramount for the successful transfer of environmental risk.

Finally, site owners should ensure that the consultants, contractors, and construction firms involved in characterizing and redeveloping sites are retained via standardized contracts with appropriate indemnification language. Contracts must include insurance requirements and owners should obtain certificates of insurance demonstrating adequate professional, general liability, and pollution liability coverage. Contracts and insurance policies can serve as important controls in limiting unexpected costs if pollution conditions are exacerbated or unknown pollution conditions are discovered.

Risk management

Modifications to site layouts and construction plans can be an effective risk management strategy.

This may include incorporation of engineering and institutional controls that blend with intended site uses. Proactive use of vapor barriers, groundwater use restrictions, configuring buildings away from contaminated areas, use of paved roadways and parking areas as caps for soil contamination, or incorporating green space in strategic locations, can reduce site investigation and remediation cost as well as lower construction and site operational risks. Environmental restrictive covenants (i.e., deed notices) and compliance with area-wide municipal ordinances are often effective mechanisms for documenting and demonstrating conformance to such controls.

Anticipating required soil and groundwater characterization and disposal requirements associated with construction plans via a written SMP can save time and money. These site-specific plans are often prepared for redevelopment projects, as part

of site closure work plans, and/or used in conjunction with post-closure institutional controls. In addition to outlining site history, management responsibilities, and worker health and safety controls, SMPs should provide specifics on: excavation and dewatering work plans; soil stockpile management; erosion, dust, and stormwater controls; soil and groundwater monitoring; waste characterization and disposal; and soil reuse and/or backfill requirements.

SMPs can help reduce redevelopment risks, but they should not be viewed as a substitute for comprehensive geotechnical or environmental site investigations. Pollution conditions, proposed remedial actions, anticipated urban fill, and contaminated soil and dewatering volumes should already be well understood. SMPs are effective tools for ensuring appropriate project controls are implemented, while also providing protocols for dealing with the unexpected. However, most of the soil excavation, dewatering and disposal costs should already be accounted for in redevelopment financing, with SMPs relied upon to address minor exceptions.

Claim scenarios

The following scenarios are based on actual claims submitted to, and actively managed by AXA XL’s claims team.

Urban revitalization project incurs \$3 million in impacted soil removal

A property developer in Connecticut was initiating development activities for an urban revitalization project that consisted of 14 residential units at a site owned by a municipality. During initial site preparation it was determined that the historic fill on the site was impacted with polycyclic aromatic hydrocarbons (PAHs). Remedial efforts consisted of excavating the entire site to between six and ten feet and disposal of the soil. Due to the soil volume and soil density, the remediation efforts exceeded \$3.2 million.

Off-site impacts from chlorinated solvents at redevelopment site

A family owned chemical blender and distributor purchased and redeveloped a former rock quarry and asphalt plant site in the mid-1970s. No environmental assessments were known to have been conducted on the site when it was purchased. After years of industrial use, portions of the property were proposed for sale and redevelopment for commercial use as part of a regional brownfields revitalization program. During site area investigation activities, an adjacent property owner discovered chlorinated solvents on their property, alleged to have originated from the insured’s location. The state environmental regulatory agency required comprehensive soil vapor, soil and groundwater sampling. It was determined the contamination resulted from years of gradual leaks and spills, as opposed to a single release. Indemnity payments of \$1.2 million have been paid to date with on-going investigations and remediation occurring.

School campus redevelopment reveals soil contamination

A California school district planning to conduct expansions and renovations at their campus using public funding was required to conduct an environmental due diligence investigation. Investigations revealed pesticide and metal (arsenic and lead) soil contamination on the property. It was determined the contamination was a result of historic agricultural and orchard use dating to the early 1960s. Remediation estimates are \$800,000 over one year.

Property buyer retains responsibility for redevelopment remediation

During a property transfer, indemnities were in place for the selling entity to retain liabilities for all petroleum contamination at this former commercial office building that was constructed in the 1970s. After the sale, the new property owner was conducting geotechnical testing for future building construction when petroleum staining and odors were identified. Further investigations revealed that the impacts also included PAH and heavy metal exceedances related to historic fill placement. Because these new contaminants were not specifically included in the indemnification agreement, the liability remained the responsibility of the buyer. Remediation costs exceeded \$700,000.

VOCs abundant at printing facility redevelopment site

Prior to obtaining a loan to redevelop a former printing facility, the lending institution of the developer required a Phase I ESA, which recommended a Phase II ESA. Soil and groundwater impacts of PCE, DCE, toluene and other VOCs were identified. Soils were excavated, and a soil vapor extraction system was installed to address soil vapor concerns on the property. The groundwater contamination was more extensive, requiring four years of active groundwater treatment. Incurred costs for remediation efforts exceeded \$800,000 and the loan was not granted until an NFA letter was issued by the regulatory agency. This resulted in significant project delays and lost opportunity costs.

Industrial complex redevelopment with prior No Further Action (NFA) determination

Excavation and grading activities beneath several old industrial buildings discovered subgrade sumps, pits, trenches, vaults, USTs, and other features with localized “hot spot” areas of soil contamination containing TPH and metals including hexavalent chromium. Although the site had received an NFA for both soil and groundwater, additional contamination was found during redevelopment not previously known. Remediation costs exceeded \$2.1 million.

Golf course chemical application causes significant additional redevelopment expense

A former country club property proposed for single family home redevelopment was required to complete additional soil and groundwater investigation. This resulted in the identification of metals and pesticides in soils primarily around tee and green areas of the former golf course. Soil excavation and off-site disposal was required to achieve residential development standards. Remediation costs exceeded \$900,000.

Contaminated groundwater excavation dewatering during site redevelopment

A 200+ acre former industrial property was undergoing redevelopment for reuse as an office and warehouse complex. During construction, groundwater containing elevated metals from excavation areas was improperly discharged to a nearby waterway. A notice of violation was issued by regulators along with a requirement to investigate the source of impacted groundwater. Incurred cost for investigation and remediation expense exceeded \$2 million.



Conclusion

Site redevelopment can be a lucrative business proposition and transform underutilized and underperforming real estate into a productive revenue generating asset. However, there are a myriad of site redevelopment environmental risks that must be considered and actively managed. These include understanding historical site activities; adequately characterizing the site; addressing third-party and off-site risks; dealing with soil, groundwater, and soil vapor contamination; and anticipating the potential for regulatory reopeners. Contracts and environmental management plans are key risk management tools that must be employed before any site preparation activities are underway.

As a component of a sound risk management program, AXA XL can provide pollution insurance policies to assist site owners, buyers, developers, consultants, and contractors involved with sites proposed for redevelopment. AXA XL offers a Pollution and Remediation Legal Liability policy that can provide coverage for fixed real estate assets and brownfields sites. Policies can be structured to cover historic risks as well as post-construction operational risk. AXA XL also offers Professional and Contractor’s Pollution Liability policy to provide coverage for firms involved with site investigation, remediation, and construction. Policies can be structured to provide first and third party remediation coverage for unknown pollutants, exacerbation of known contamination, and a variety of third party claims and related legal defense expense.

Property owners and developers must use an effective combination of environmental due diligence, risk management practices, contractual tools, and insurance programs to proactively manage redevelopment risks and avoid impacts to their profitability and reputation.

Contracts and environmental management plans are key risk management tools



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