



TAPPING OUT IN CULVER CITY: RE-ENVISIONING THE INGLEWOOD OIL FIELD

A comprehensive project submitted in partial fulfillment of the graduation requirements for the degree Master in Urban and Regional Planning

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DISCLAIMER



This report was prepared in partial fulfillment of the requirements for the Master in Urban and Regional Planning degree in the Department of Urban Planning (“Department”) of the University of California, Los Angeles. It was prepared at the direction of the Department and the City of Culver City as a planning client for the comprehensive project. The views expressed herein are those of the authors and not necessarily those of the Department of Urban Planning, the UCLA Luskin School of Public Affairs, UCLA as a whole, or the client. Any errors or omissions are those of the authors.

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Aerial view of the Baldwin Hills Scenic Overlook and Culver City's portion of the Inglewood Oil Field below. Courtesy of Google Earth, June 2020.

EXECUTIVE SUMMARY

The Inglewood Oil Field is the largest urban oil drilling field in the country (Vives, 2012). About 10% of the field is within Culver City (“City IOF”), and the rest is in unincorporated Los Angeles County (“County IOF”). Culver City has taken an important step towards a future redevelopment of their portion of the oil field by voting in May 2019 to study amortization, or the return on investment status of oil facilities, which is a necessary part of potentially decommissioning the field. This comes after many years of community concern regarding the impact of oil field operations on public health and land use compatibility.

This report on the Inglewood Oil Field addresses the legislative, political, and regulatory framework of urban oil extraction in California, and specifically, in Los Angeles County. As Culver City moves to update its General Plan, we recommend the city change the Conditional Use Permit and enter into negotiations with Sentinel Peak Resources, as well as the subsurface rights owners. Beyond this recommendation, we discuss three considerations for the future of the oil field. The first recommendation is based on existing constraints, particularly the high cost of remediation and uneven topography of the site. We suggest splitting the site into two less sensitive land uses, green space and solar farming. This reduces the cost by only requiring the lowest level of remediation, while supporting the green vision of Culver City. The second proposal looks beyond site constraints – while this may not be plausible in terms of engineering, it does highlight the potential benefit of adding urban retail and office space for the city. The third set of recommendations is with regards to the Culver City General Plan update, which includes strengthening the existing language to be strongly in favor of future green initiatives and pushing for a coordinated decommissioning approach with Los Angeles County for the entire Inglewood Oil Field.

Urban oil field redevelopment is not new – much of Los Angeles was once composed of oil fields that now have alternate uses. In recent years, with new expectations and more stringent regulations on cleanup procedures, there is often a high remediation cost associated with such projects. Moreover, highly contaminated sites are not only

expensive to remediate but will have limited future potential uses. Culver City is at the forefront of urban oil field redevelopment due to an amortization study completed on May 29, 2020. The only similar study by the City of Goleta reviews onshore gas and oil facilities, though is not equivalent to urban oil drilling fields (Cheek, Flessner & Kemp, 2016). The lack of comparable case studies limits the accuracy of cost estimation for remediation and redevelopment. Given the scope of the amortization study and the Inglewood Oil Field itself, Culver City should use this opportunity to become a regional leader on the topic of decommissioning and redeveloping oil fields.

This report combines outside research with the expertise of stakeholders involved in the oil operator regulations process to roughly estimate the feasibility of various redevelopment options. We model a decommissioning matrix based on available research, describing potential costs based on the levels of remediation required, as well as the sensitivity and intensity of use afterwards. In this way, the report provides a framework for public discussion around the future of the oil field, and potential recommended use scenarios based on rough cost estimates.

Our report on the Inglewood Oil Field began prior to the COVID-19 pandemic. The current pandemic also raises questions about how urban spaces are designed, what investments are made, and the adaptability of such resources. The agenda of Culver City has placed a strong emphasis on green initiatives – specifically through electric vehicle charging stations, Energy Upgrade California, City Hall Zero Waste Program, and Clean Power Alliance. The neighboring Inglewood Oil Field overshadows these efforts. Furthermore, the existence of 77.8 acres of under-developed land in a thriving real estate market may have high redevelopment potential. The COVID-19 situation has highlighted the need for adaptable land uses, while stressing the lack of suitability and impracticality of oil investments in Culver City. We take these considerations in mind when analyzing the redevelopment potential and constraints of the Inglewood Oil Field, and hope this report serves as a guide for navigating the decommissioning process.

INTRODUCTION

The Inglewood Oil Field is an oil reservoir defined by various surface, subsurface, ownership and land use rights boundaries. The site has been used for oil drilling and production since the 1920s. The first oil-producing well was drilled in 1924, and by 1925, over 50,000 barrels of oil were produced per day (Inglewood Oil Field Draft EIR, 2017). The City of Culver City has jurisdiction over 10% of the Inglewood Oil Field. The remaining 90% falls within unincorporated Los Angeles County and is regulated by the Baldwin Hills Community Standards District (CSD). We utilized a cutoff date of May 30, 2020 to identify that there are currently 69 total wells within the Culver City portion of the Inglewood Oil Field. Of these, at least 30 have been abandoned, leaving 39 active or potentially active.

This report examines the current legislative, political, social, and economic landscape of oil drilling operations in Culver City, and more broadly, in the County of Los Angeles. By building a framework summarizing current support and opposition from both policy and community perspectives, in addition to analyzing the redevelopment of former oil drilling sites elsewhere, we hope to uncover the redevelopment potential of the Inglewood Oil Field. A glossary of oil and gas industry related terms is located at the end of this report.

Our project addresses the following research questions:

1. What are the challenges and opportunities within the current legislative, regulatory, political, social, and economic landscape of ending oil drilling operations in Culver City, and more broadly, in Los Angeles County?
2. How can an amortization study, as well as case studies analyzing the redevelopment of former oil drilling sites elsewhere, inform a potential phasing out of oil drilling in Culver City?
3. What does a best practices framework look like based on previous land decommissioning and brownfield redevelopment?
4. What is the estimated impact of the oil field decommissioning to Culver City?
5. How do existing conditions translate into constraints on the redevelopment of the oil field into alternative land uses?

We have produced a set of recommendations for Culver City based on an analysis of current oil field productivity and limitations for alternative uses. To do this, we have analyzed (1) oil field redevelopment potential, (2) existing conditions in the legislative and community landscape, and (3) constraints to a viable project given the unique

geographical factors of the Culver City oil field. Our first recommendation analyzes the simplest and most financially feasible option, in the form of green space and solar panels. The second recommendation moves beyond these existing conditions and constraints, to suggest the potential economic benefit of developing urban retail and office space on the site. The third consideration includes suggestions for the Culver City General Plan update.

To arrive at these conclusions, we have structured our report to include a background of oil drilling practices in Los Angeles County. A literature review was conducted to highlight findings that link health, the environment, and housing values to oil operations – in addition to creating a best practices metric for decommissioning and redevelopment practices. We supplement these findings with case studies of oil field redevelopment in or near Los Angeles County. Our analysis draws on available oil field data and key takeaways from case studies of brownfield redevelopment to inform a set of recommendations for the potential phasing out of Culver City oil and gas drilling activity into future land uses. We present an analysis of publicly available sources that have studied land productivity, environmental conditions, and health impacts, through the lens of the Inglewood Oil Field. Our findings explore limitations of the oil field regarding alternative uses and the potential of applying a more comprehensive scope to redevelop the entirety of the field beyond Culver City boundaries.

In the Land Use Element of the existing Culver City General Plan, the Inglewood Oil Field is zoned as R1 (Residential), OS (Open Space) and IG (Industrial General). Oil uses are not allowed under any of these zones, except as a continuing legal nonconforming use per Culver City Municipal Code (CMCC) Section 17.610.010.D. The amortization study will allow the city to determine whether the current oil operator has reached a return on investment of their oil infrastructure. The findings of this study suggest that Sentinel Peak Resources will receive a reasonable return by 2021, meaning the city can use regulatory rights over land use to end oil drilling without it being a taking (Cheek, Flessner & Kemp, 2020). The complication in this process is that it involves subsurface rights and potentially prolonged litigation. In written responses submitted after the release of the amortization study report, current subsurface property owners indicated they would pursue legal action against the city if it were to exercise its regulatory powers. A comprehensive solution would require purchasing these mineral rights. It is difficult to ascertain a complete list of the City IOF subsurface royalty owners, but it includes a number of individual interests and family trusts.

Depending on the type and level of contamination, there may be several agencies involved in the handover to a redevelopment partner or company. The State of California's Department of Toxic Substances Control ("DTSC") typically oversees the remediation schedule, whereas the LA County Fire Department tackles soil issues. The LA Regional Water Quality Board may play a role in groundwater issues, whereas the removal and transportation of soil will require appropriate permits from the Southern California Air Quality Management District. Any abandoning or capping of wells requires prior approval from the California Geologic Energy Management District ("CalGEM"). An environmental assessment is necessary to determine the current condition of the oil field, of which testing and results must be reported to CalGEM and LA County Fire as well. Since several agencies will be involved, this assessment is the critical first step in determining what remediation work needs to be done and which agencies to coordinate with.

This report began before the COVID-19 pandemic shut down much of normal life and the US economy. In the midst of these new circumstances, the volatility of oil prices has been particularly acute. On April 20, 2020, the price per barrel of oil reached negative numbers to approximately -\$40 (Reed & Krauss, 2020). This dramatic decline is caused by a dramatic fall in demand and lack of available storage space. This reflects a particular contract in time, and is not an indicator for oil price trajectories in general. Yet it points to a further concern of the sustainability of this resource in the long run. Culver City is poised to take the lead in not only the decommissioning process of a portion of the largest urban oil drilling field in the country, but doing so in a time of economic recovery.

BACKGROUND



This section provides an overview of the historical significance of oil fields in both Los Angeles County and Culver City. This includes an estimate of active, idle, and abandoned oil wells. We also assess the environmental and health impacts of the existing oil field. Lastly, we review academic theories of land use to consider how the oil field affects neighboring housing values, including the mineral rights of those who own the land. We note an impact of oil fields on neighboring housing values, which is expected to increase if redeveloped. In addition, case studies of former brownfield redevelopment reveals different types of future uses and levels of remediation that accompany them.

Culver City only has jurisdiction over 10% of the Inglewood Oil Field. This portion includes approximately 69 total wells, of which 30 are active and approximately 39 are idle or plugged. This comprises less than 1% of the total oil and gas wells in Los Angeles County, indicating that Culver City has a very small impact on regional operations. At the height of oil production in 1969, the Los Angeles basin produced 133 million barrels (Center for Land Use Interpretation, 2010). In comparison, Los Angeles County extracted only 11 million barrels of crude oil from onshore operations in 2018 (US EIA 2019) – wherein the entire Inglewood Oil Field produced 5,520 barrels per day of crude oil in 2017 (Cheek, Flessner & Kemp, 2020).

Overview of Study Area

Culver City oversees approximately 77.8 acres out of the entire 1,000 acres of the Inglewood Oil Field. Culver City maintains local oversight of oil and gas development and operations under Culver City Municipal Code (CCMC) Chapter 11.12. The remaining 90% falls within unincorporated Los Angeles County and is regulated by the Baldwin Hills Community Standards District (CSD) and overseen by the LA County Department of Regional Planning (DRP). The Los Angeles County Board of Supervisors governs all unincorporated areas.

It is important to make the distinction that the City and County IOF are overseen by their respective local regulations. In October 2008, the Board of Supervisors adopted the current Baldwin Hills Community Standards District (BHCSA) which provides oversight of oil and gas drilling operations for the County IOF. As part of the BHCSA, the Department of Regional Planning is also required to coordinate the Baldwin Hills Community Advisory Panel with local leaders, oil operator officials, and assorted stakeholders to receive updates on oil drilling operations and voice community concerns. In March 2016, the Board of Supervisors instructed DRP to update oil and gas regulations to reflect best practices using current mitigation methods and technologies, minimize environmental impacts, and protect sensitive uses and populations in unincorporated Los Angeles County (LA County

DRP, 2020). DRP staff has been collecting preliminary comments on existing regulation and production during Fall 2018 and Winter 2019, with no recent update (LA County DRP, 2020). Notably, new oil well regulations arising from this process will not apply to the Baldwin Hills CSD. Conversations with the LA County Department of Regional Planning also indicate that there are no steps being taken to decommission the unincorporated county portion of the field.

In the City IOF, the Culver City Municipal Code Chapter 11.12 “Oil, Gas, and Hydrocarbons” provides language regulating the permitting and operations of oil and gas activities within their jurisdiction. These oil regulations were last updated in 2003. The City had sued the County for inadequate language in the first iterations of the BHCSO, which resulted in settlement agreements strengthening the County’s regulatory oversight of the Inglewood Oil Field. The City also took steps to improve its own regulations, leading to the release of the Discussion Draft Oil Drilling Regulations in 2013 for the City IOF. A 2014 resolution, after much community input, led to updated guidelines set forth in a Draft Specific Plan for the Inglewood Oil Field and the completion of an Draft Environmental Impact Review EIR. Further proceedings to adopt the Specific Plan were placed on hold after Culver City approved an amortization study in Spring 2019.

The Inglewood Oil Field Operator - holding the oil and gas drilling and operations rights for the entirety of the field - has changed hands multiple times over the field’s long history. Ownership of oil and gas drilling rights was highly dispersed across the oil field in its early beginnings. Standard Oil made a series of acquisitions in the field in the early 20th century, but it was Chevron that succeeded in consolidating ownership of oil and gas drilling rights of the IOF in the late 1970s. Most recently, Freeport McMoRan Oil and Gas (FMOG) became the Oil Field Operator for the entire field after purchasing the rights from Plains Exploration and Production Company (PXP) in 2014 (IOF Specific Plan Project Draft EIR, 2017). In 2017, FMOG sold all of its onshore California oil and gas properties (including the Inglewood Oil Field) to the current operator, Sentinel Peak Resources California LLC (SPR).

Sentinel Peak Resources primarily focuses on acquisitions and intensive oil development in California. The Inglewood Oil Field itself has been used for drilling and production since the 1920s (IOF Specific Plan Project Draft EIR, 2017, Section 2-1). Oil uses are allowed to continue within the City IOF as a legal nonconforming use per the provision of CCMC Section 17.610.010.D. Based on 2015 estimates, 2.38 million barrels of oil were produced by the entire Inglewood Oil Field. The U.S. Energy Information Administration estimates an average of \$49 per barrel of crude oil for that year, suggesting roughly \$116.62 million in revenue (US EIA 2016).

Figure 1 below maps the Culver City boundary of the Inglewood Oil Field. The study area is bordered to the north, west, and east by city park and open space, to the northeast by the Blair Hills neighborhood of Culver City, and by the County portion of the Inglewood Oil Field to the south (IOF Specific Plan Project Draft EIR, 2017, Section 2-2).

Figure 1. Inglewood Oil Field, detail of Culver City portion



In 2017, Culver City studied the environmental impacts of hydraulic fracking and concluded that significant unavoidable seismic-related impact could result (CCMC p.24). Current oil drilling regulations set forth in Chapter 11.12. require a comprehensive and coordinated approach to the management of oil and gas activities with a focus on minimizing adverse environmental concerns (CCMC p.26).

As for current efforts to understand the various impacts of the oil field, Culver City commissioned an amortization study in 2019 to determine the plausibility of decommissioning their portion of the Inglewood Oil Field. The findings highlight that Sentinel Peak Resources will likely receive an amortization of their capital investment in the IOF by 2021 (Cheek, Flessner & Kemp, 2020).

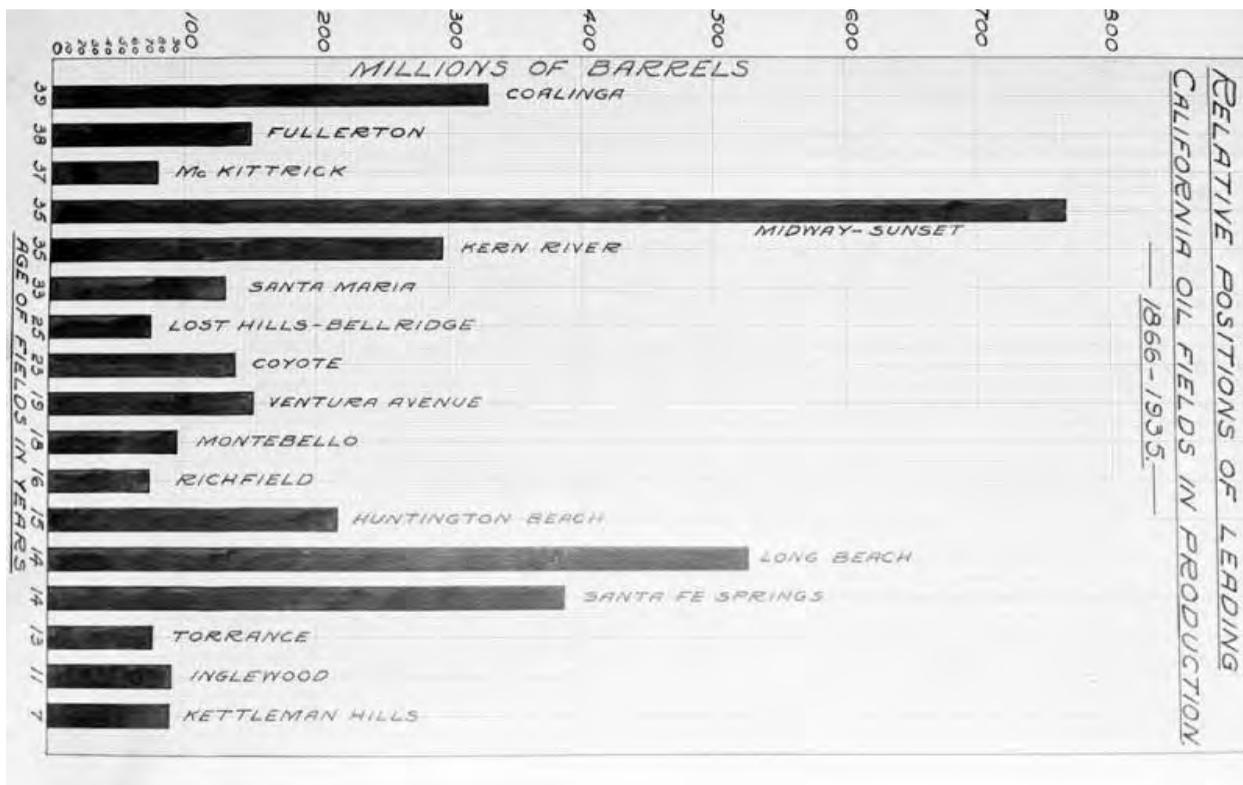
Existing oil drilling regulations were implemented in 2013, and to further address health-related concerns, the California Air Resources Board (CARB) intends to study air quality near the Inglewood Oil Fields as part of the Study of Neighborhood Air Near Petroleum Sources (SNAPS) program.

Overview of Oil Fields in Los Angeles

The discovery of oil in the late 1800s near what would be Dodger Stadium today has significantly shaped the economic development trajectory of the County of Los Angeles. The population of the region grew in part to support oil production operations. Figure 2 below lists the leading oil drilling fields from the year 1866 to 1935 in California – it shows that the Inglewood Oil Field was both newer and smaller in terms of oil production.

To support this rapid growth, residential development occurred simultaneously and often in close proximity to active, idle, and haphazardly abandoned wells (LA Office of the Controller, 2018). This was done in the absence of federal, state, or local regulations on oil well initiation and abandonment procedures.

Figure 2. Relative Positions of Leading California Oil Fields in Production 1866-1995



Source: Works Progress Administration Collection (ca. 1935). Courtesy of City of Los Angeles Public Library, Tessa Digital Collections.

The scope of the oil industry has decreased significantly since its peak in the late 1960s, but the environmental impacts and much of the physical infrastructure remain (Liberty Hill Foundation, 2015). Within the County of Los Angeles, major oil fields were identified and established in Santa Fe Springs and Long Beach – as well as the neighboring city of Huntington Beach in Orange County. Smaller oil sites include Los Angeles, Union Station, Boyle Heights, Downtown, Las Cienegas, Inglewood, Playa del Rey, Venice, Sawtelle, San Vicente, Rosecrans, and Wilmington.

Figure 3 provides a summary of the largest oil and gas fields by operator in unincorporated areas of Los Angeles County, with Figure 4 indicating their relative locations. It should be noted that these figures from the Los Angeles Oil and Gas Inventory Report were published in December 2015, prior to Freeport-McMoran Oil and Gas selling all of its onshore properties.

Figure 3. Summary of Largest Oil and Gas Fields in Unincorporated Los Angeles County

Location Code (see map)	Operator	Number of Wells	DRP Permits	Compliance level
1	Freeport-McMoRan Oil & Gas LLC	874	CSD	High
2,3,4	Southern California Gas Company (3 fields)	160	CUP	Low*
5,6	Vintage Production California LLC (6 fields)	135	RPP	Low*
7,8	Breitburn Operating L.P. (3 fields)	80	PP	Low*
9	Linn Operating, Inc.	75	ZEC	Low*
10	Brea Canon Oil Co.	66	ZEC	Low*
11, 12	Crimson Resource Management Corp. (3 fields)	52	None	Low*
13, 14	The Termo Company (3 fields)	47	RPP	Low*
15	TEG Oil and Gas USA Inc.	37	RPP/PP	Low*
5	LBTH Inc. (2 fields)	35	None	Low*
17	Watt Mineral Holdings LLC (2 fields)	30	CUP	Low*
18	Oxy USA Inc.	13	ZEC	Low*

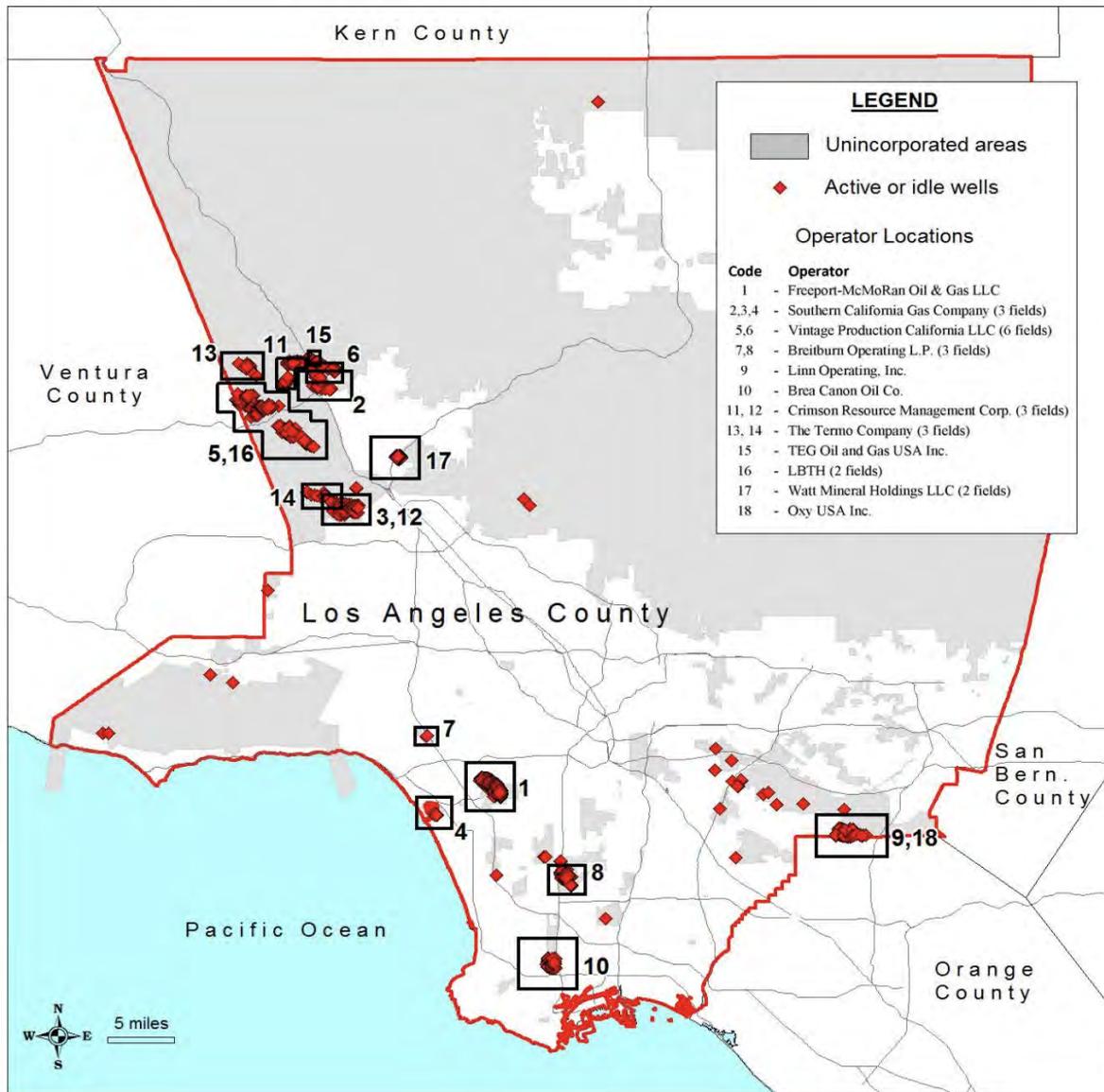
DRP Permits: CSD = Community Standards District, CUP = Conditional Use Permit, RPP/PP=Plot Plans only, ZEC = Zone Exception Case

*The classification of compliance as low is based on the scarcity of data available on existing compliance efforts. It should be noted that in some cases the level of compliance may be better described as unknown.

Source: MRS Environmental (Dec. 2015). Los Angeles County Oil and Gas Well Inventory. Prepared for Los Angeles County Department of Regional Planning.

Figure 4. Location of Oil Fields in Unincorporated Areas and Corresponding Operators

Figure 1 Largest Operators and Field Locations

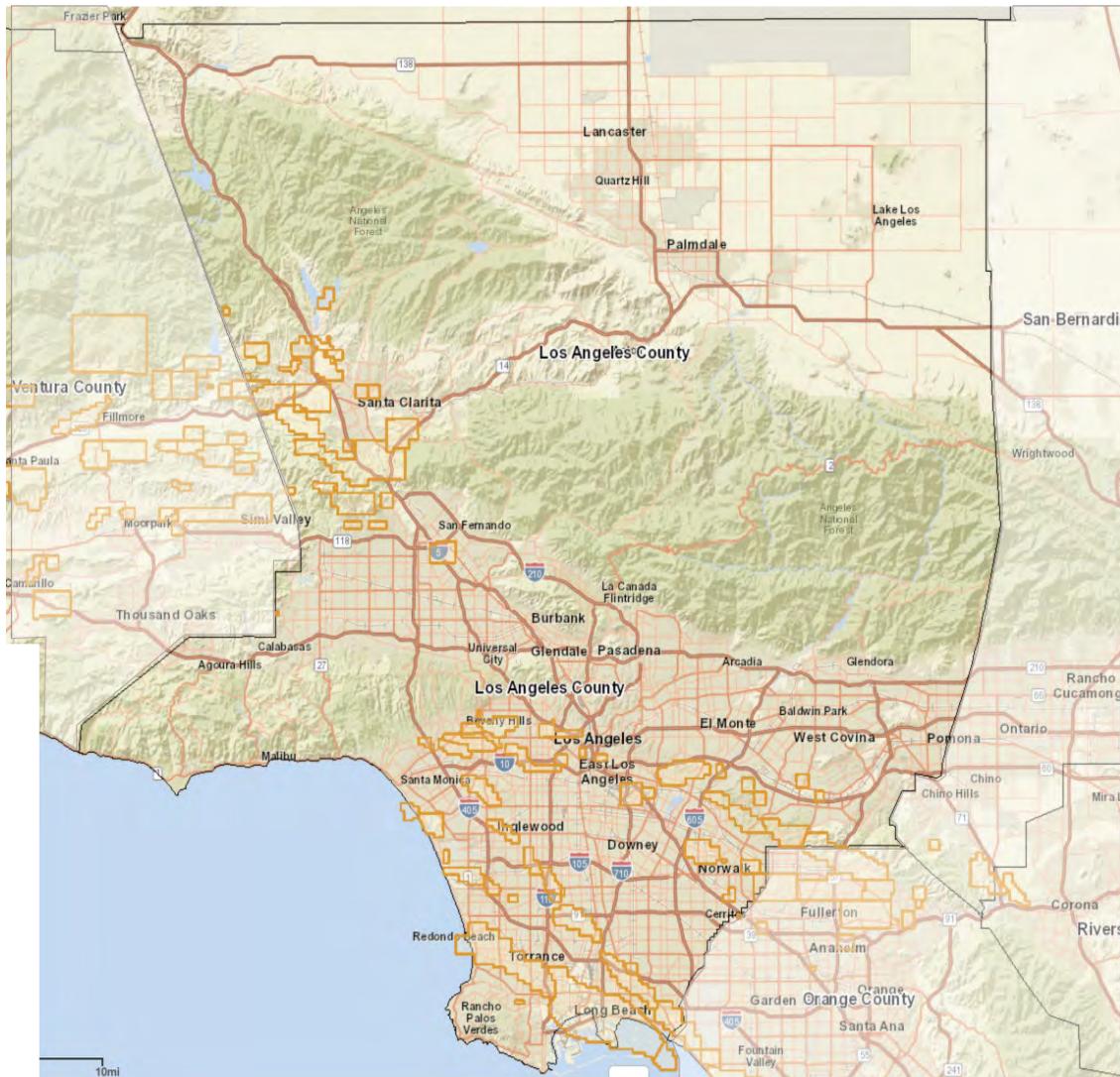


Source: MRS Environmental (Dec. 2015). Los Angeles County Oil and Gas Well Inventory. Prepared for Los Angeles County Department of Regional Planning. <http://planning.lacounty.gov/assets/upl/project/oil-gas-well-report.pdf>

Oil played a significant role in transforming both local and regional economies, including driving growth and development. The petroleum industry became a leading sector within the State of California. At the height of production in the late 1960s, the region exported 133 million barrels of oil per year – approximately a quarter of the oil and gas supply for the world. This placed several oil tycoons at the forefront such as Edward Doheny and J. Paul Getty, while also funding much of the crucial infrastructure such as highways, real estate, and even the entertainment industry (Liberty Hill Foundation, 2015). In 2015, it was reported that oil wells in Los Angeles County produce 28 million barrels per year from both onshore and offshore sites.

In terms of the geographic distribution of oil wells, Los Angeles County has over 24,000 wells mainly within 70 oil fields. There are 356 new and 4,838 active wells, totaling 5,194 in operation. Figure 5 below maps the location of all oil fields containing active wells in Los Angeles County.

Figure 5. Active Oil Fields in Los Angeles County



Source: CalGEM Well Finder (May 2020). <https://www.conservation.ca.gov/calgem/Pages/WellFinder.aspx>

Only 30 out of the 69 oil wells under Culver City jurisdiction are identified as active per state well records, comprising less than 1% of the total new and active wells in Los Angeles County. In the City of Los Angeles specifically, there are more than 5,000 known wells reported in March 2018 by the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) database – now known as the California Geologic Energy Management Division (CalGEM). Of these, 3,133 are plugged and abandoned, 930 are buried, 780 are active and producing oil, and 287 are idle. The difference between plugged and abandoned is that this practice of sealing wells with cement follows State determined procedures, whereas buried wells do not meet these standards.

There has been intense lobbying and continued national attention given to the oil and gas industries, although extraction and production no longer occurs on the same scale as it once

did. Despite onshore oil production declining over the year and offshore drilling becoming more prevalent, oil fields continue to exist and operate. The Sierra Club, a national level grassroots environmental group, has been a strong proponent of removing California from the oil business. At the state level, California provides oversight on oil and gas production in the state but as of yet, has not taken decisive action to provide further regulation and legislation in regards to urban oil drilling.

Over the years, various political interests have clashed with one another. Former governor Jerry Brown was pro-fracking, whereas the current governor Gavin Newsom opposes this practice. Governor Gavin Newsom has indicated that his office will pursue stronger oversight and regulation of the oil and gas industry, citing concerns of the long-term sustainability of the industry and its negative effects on the health and environment of nearby communities (Goldberg, 2020). The debate on decommissioning is a highly political one that pits industry interests against health concerns and environmental impacts such as climate change. Additionally, given such a large percentage of active oil wells near sensitive land uses, many coalitions argue that it jeopardizes the quality of life for residents by polluting the air and possibly even contaminating groundwater.

Considerations by Culver City

The Culver City General Plan of 1973 outlines the boundaries and land use designation for the Inglewood Oil Field under the Conservation and Recreation Elements. The Inglewood Oil Field is designated as a non-conforming land use that was envisioned into multiple repurposing scenarios to serve the city's expected population growth. In the Recreation Element, the authors recommend the future conversion of the oil fields into increased acreage for the Blair Hills neighborhood, in addition to the creation of an urban park over 50 acres within the field boundary (Culver City General Plan, 1977). The authors understood the limits of expansion within the field due to shared boundaries with Los Angeles County, however, the General Plan makes room for the possibility of annexation of those lands in the future. In the Conservation Element, the authors conclude that the supply of oil is not unlimited, therefore other uses could be explored when this land use ceased to remain economical (Culver City General Plan, 1977).

On May 28, 2019, the City Council unanimously authorized the preparation of an amortization study for Culver City's portion of the Inglewood Oil Field. Amortization refers to a point at which initial investment equals the cumulative

value of market return investment (Carter, 2019). The study will assess whether Sentinel Peak Resources has received sufficient return on their investment to justify a retraction of the Conditional Use Permit. The findings determined that this amortization of capital investment will occur during 2021, based on conservative estimates. Due to the size and location of the Inglewood Oil Field in an expensive metropolitan area, this is influential in assessing whether oil drilling is worth more or less than the cost of closing operations and redeveloping the area. Aside from economic benefits of implementing a more productive land use, home values in the vicinity may also benefit. However, other physical and political factors must be considered when estimating redevelopment potential. For instance, interested mineral rights parties have voiced their intent to file lawsuits unless a beneficial compromise can be made in the ownership transfer of subsurface rights.

Existing literature has debated the effects of natural resource development on local public health and safety, as well as on home values. Evidence suggests that the remediation of a brownfield raises property values for a nearby representative house by 1.7% to 6.2%, whereas remediation and conversion to green space together could raise values by 3.4% to 10.0% (Kaufman & Cloutier, 2006) derived from a sample study in Wisconsin. The effect on the housing market will be of particular interest to Culver City's local leadership and residents. Currently, the median home listing in the city is \$1.2 million (Realtor.com, 2020). Removing the oil field and redeveloping the land into either public open space or housing is very likely to increase home values within the vicinity of the oil field.

Community Support and Opposition

The Inglewood Oil Field has been at the center of community concerns for many years due to its proximity to neighborhoods in Culver City and unincorporated Los Angeles County. Notably, Culver City's local stakeholders, including residents and civic leadership, strongly oppose the continued oil drilling operations in their city. The City Council's vote to approve an amortization study reflects an important step in the process of phasing out of the business of neighborhood oil drilling in Culver City's portion of the Inglewood Oil Field.

Input provided at local community meetings have made clear that many Culver City community members are concerned about the impact of oil drilling operations on public health, air quality, and local seismic activity. They have called for more stringent community air monitoring from CARB and have advocated for stronger continued oversight of the oil field operator, Sentinel Peak Resources, by the LA County Department of Regional Planning. Furthermore, the Baldwin Hills Community Advisory Panel is pursuing County funding for an LA County Department of Public Health study of the oil field in relation to cancer clusters in the surrounding neighborhoods. These community stakeholders are actively involved in monitoring these issues in the absence of a straightforward path to decommissioning the oil field.

Opposition to urban oil drilling for the wider Los Angeles region is organized and led by community-based coalitions, such as STAND-LA, and are advocating for a 2,500-foot setback distance from oil operations. Jurisdictions in California have the lowest setback distances in comparison to others nationwide. Figure 6 below shows the differences in setbacks for jurisdictions regulated by CARB and AQMD, as compared to other jurisdictions across the country. The former sees more stringent controls on emissions, whereas the latter is lacking in that aspect but have stricter setbacks. The issue of what setback distance is adequate for highly populated urban areas is hotly contested between community coalitions and oil industry-backed advocacy.

Figure 6. Emission Controls and Setback Distances.

Jurisdiction	Vapor Recovery on Tanks and Vessels	Vapor Control on Compressors	Instrument Air on Pneumatic Devices	Leak Detection and Repair for Components beyond Federal Regs	Mandatory Tax on Greenhouse Gas Emissions	Community Air Monitoring	Setback Distance in Feet
Emission Control Regulations in California Most Stringent in the Nation							
Jurisdictions Regulated by CARB and Regional Air Districts							
City of Los Angeles	✓	✓	✓	✓	✓	✓	200
Los Angeles County	✓	✓	✓	✓	✓	✓	300
City of Carson	✓	✓	✓	✓	✓	✓	750
Orange County	✓	✓	✓	✓	✓	✓	150 Residential 300 Schools
San Bernardino County	✓	✓	✓	✓	✓	✓	n/a
Riverside County	✓	✓	✓	✓	✓	✓	n/a
Kern County ⁶	✓	✓	✓	✓	✓	✓	210
Other Jurisdictions with Setbacks							
Colorado	✗	✗	✗	✗	✗	✗	500 Residential 1,000 Schools
Maryland	✗	✗	✗	✗	✗	✗	1,000
Santa Fe County, NM	✗	✗	✗	✗	✗	✓	750
Oklahoma City, OK	✗	✗	✗	✗	✗	✗	600
City of Arlington, TX	✗	✗	✗	✗	✗	✓	600
City of Dallas, TX	✗	✗	✗	✗	✗	✓	1,500
City of Flower Mound, TX	✗	✗	✗	✗	✗	✓	1,500
City of Fort Worth, TX	✗	✗	✗	✗	✗	✓	600

Source: Californians for Energy Independence

Source: Sedgwick, Shannon, et. al. (Oct. 2019) "Setback Requirements On Oil And Gas Production: Economic Activity At Risk In Los Angeles." Los Angeles County Economic Development Corporation.

RESEARCH ON THE IMPACTS OF URBAN OIL FIELDS AND THEIR POTENTIAL FOR REUSE

In this section, we discuss available literature on urban oil fields. This includes academic papers and reports on topics related to health, environment, and economic value. To summarize, health concerns primarily focus on air pollution since it is easier to link available data with negative health impacts. Air pollution studies involve comprehensive data on a range of particulate matter that can be more conclusively tied to incidences of negative health conditions in neighboring communities. The pollutants produced by oil drilling and extractions have been linked to higher occurrences of asthma, low birth weight, and heart disease.

Complaints of induced headaches, nausea, and nosebleeds can be traced to foul odors resulting from oil fields. However, studies on cancer are not as prevalent, since longitudinal data is lacking and it is difficult to pinpoint the role of oil fields in contributing to this condition – especially because cancer in itself is complex and may derive from a variety of genetic, lifestyle, and environmental factors. Health is also discussed in conjunction with environmental degradation, along with debates on induced seismicity and earthquakes.

Available literature on brownfield redevelopment and large land parcels decommissioning is reviewed in order to create a best practices evaluation metric framework. This includes using metrics ranging from level of contamination to understanding restrictions imposed by institutional controls, in addition to suggesting strategic planning to achieve the best economic and environmental outcomes. Furthermore, the housing market is analyzed through the lens of home values and how they are negatively impacted by nearby natural resource developments. By tying this in with the Blair Hills neighborhood overlooking the Inglewood Oil Field, it provides an idea of how Culver City may consider capturing this value after redevelopment.

Health

A major reason to decommission urban oil fields is their negative health impact on neighboring communities. In the City of Los Angeles, which is the site of numerous active oil well site clusters, 70 percent of active oil wells are within 1,500 feet of a home, school, or hospital (Liberty Hill Foundation, 2015). Over half of the County of Los Angeles falls under the top 20% most environmentally polluted and socially vulnerable

areas in California measured by CalEnviroScreen. Oil production is responsible for creating hundreds of gallons of wastewater per barrel of crude oil produced and increased smog levels (Liberty Hill Foundation, 2015). In addition to wastewater and smog, oil production can contribute to air pollution and worsen quality for surrounding neighborhoods – which is linked to additional health consequences.

Other reports provided by the City of Los Angeles and other organizations note the link of health issues to oil-related operations. The Drilling Down Report produced by the Liberty Hill Foundation cites various studies in which oil drilling and extraction have been associated with air pollutants, which can cause health concerns such as asthma, low birth weight, and further exacerbate heart disease (2015).

Studies have also been conducted in Los Angeles to analyze this relationship between oil production and health. Shamasunder et al. (2018) studied the impacts of urban oil developments in South Los Angeles on community health and exposure. Household surveys were gathered in 1,500 foot buffer zones near two oil production sites, West Adams and University Park, with both having higher asthma rates than overall rates in Service Planning Area 6 designated by the California Health Interview Survey (CHIS) and Los Angeles County. Asthma rates in West Adams were significantly higher than those of Los Angeles County, and 45% of respondents were unaware of the oil development and 63% did not know how to contact local authorities. This study highlights the environmental justice concern for community health and exposure, though it does not provide a conclusive relationship between asthma rates and nearby oil production.

The use of 1,500 foot buffer zones in the Shamasunder et al. (2018) paper points to another debate. Are these setbacks sufficient in protecting communities from oil-related health risks? In November 2013, the Los Angeles Times reported on federal environmental officers feeling ill from toxic vapors while touring Allenco Energy Co. site in University Park – one of the study areas in the Shamasunder et al. (2018) paper. The EPA investigation was a result of hundreds of complaints regarding the odor, which neighbors said caused headaches, respiratory ailments, nausea, and nosebleeds. Between 2010 to 2013, residents filed 251 complaints against Allenco Energy Co. with the South Coast Air Quality Management District, resulting in 15 citations to the company for foul odor and equipment issues (Sahagun, 2013).

Constant exposure may still contribute to illnesses, even when air quality samples were found to be under the regulatory standards. The Allenco drilling site is located in historic South Los Angeles, where local residents bear the burden of low-income housing and schools. This poses integral questions in the debate of continued neighborhood oil drilling, such as whether existing regulations for oil production facilities and practices are in the best interest of the community, given that the Allenco Energy Co. has a history of violations.

Other scholars have reviewed the potential hazards of air pollution from oil and gas operations on the respiratory health of children and infants. Webb et al. (2016) note a lack of long-term data on direct impacts of oil operations to health, but have found negative effects on respiratory health linked to exposure to pollutants such as benzene, formaldehyde, and particulate matter – which can be used as a proxy for the emissions near oil operation areas.

A report from the Natural Resources Defense Council (NRDC) provides a more comprehensive review of the various health risks posed by hydraulic fracturing, spanning from water contamination to air pollutants and smog (Srebotnjak & Rotkin-Ellman, 2014). Despite the regulations posed by the Environmental Protection Agency (EPA), Srebotnjak & Rotkin-Ellman

(2014) find gaps that allow the oil and gas industry to be exempt from these requirements. The state has a role in implementing adequate regulations and effectively monitoring these operations, but the question of what is sufficient protection remains murky. Lack of strong state control can lead to oil industries easily bypassing restrictions, unless local jurisdictions further impose their own guidelines.

Environmental

The environmental aspect of oil development and production is heavily researched, mainly due to linkages between degradation of natural resources (such as impacts to soils, surface, groundwater, and local ecosystems) and impact on neighborhood health. A comprehensive report by the Center of Health and the Global Environment at the Harvard Medical School on the life cycle analysis of the health and environmental impacts of oil provides a breakdown of the effects of oil recovery for each stage of production (Epstein et al., 2002). With regards to drilling and extraction, it cites chronic environmental degradation such as the release of hydrocarbons into water, increased concentrations of naturally occurring radioactive materials, and soil contamination. While these processes tend to occur gradually, this report addresses more immediate hazards such as oil spills during transporting, as well as fires, explosions, and chemical spills or leaks. Though the report analyzes these impacts in an ecosystem capacity, it provides further insight on the potential effects on human health.

Seismicity is also a consequence of oil drilling activities. A common misconception is that induced seismicity only occurs close to and at the same depth as injection wells (Rubinstein & Mahani, 2015). Seismicity can be induced at 20 km or more from the injection site and at even greater depths. Additionally, while most injection wells may not cause earthquakes, they may be inducing microearthquakes – the research on this is limited as studies are mainly focused on larger earthquakes. The significance of induced seismicity is particularly acute for Culver City, as the Inglewood Oil Field sits on top of or in proximity to three major faults: Charnock Fault, Overland Avenue Fault, and Newport-Inglewood Fault Zone. The legitimacy of induced seismicity is still debated, but oil infrastructure in earthquake prone regions has the potential to become a serious hazard in the future.

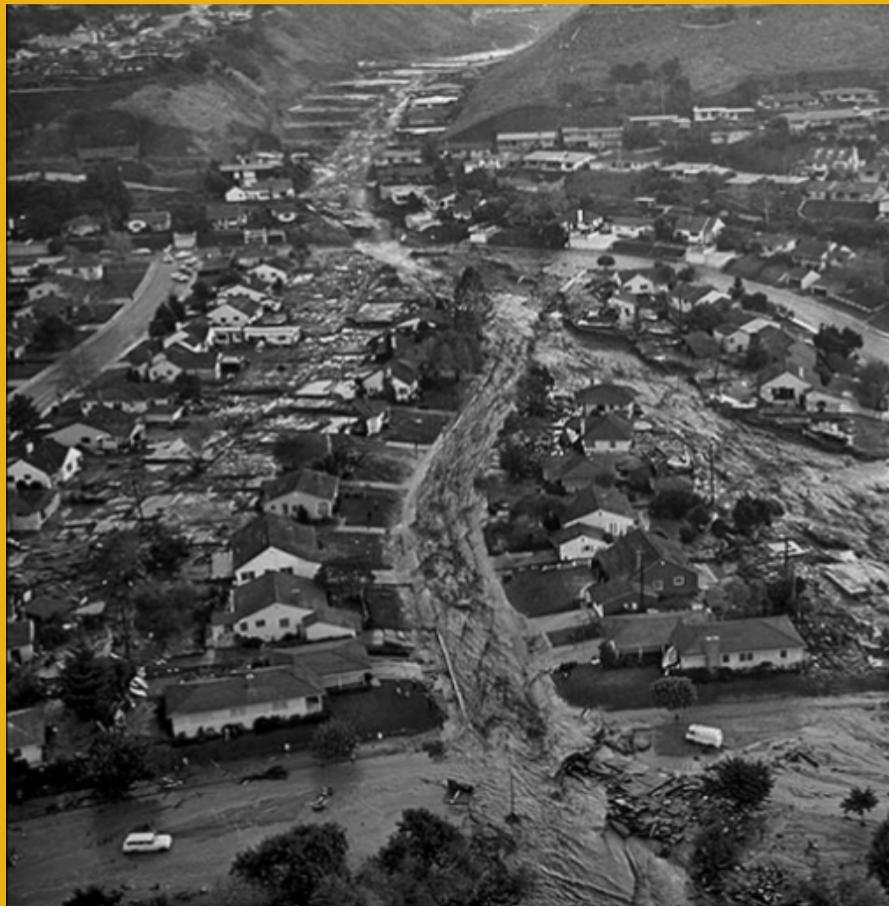
The Inglewood Oil Field also exhibits signs of surface subsidence across the length of the field. Subsidence is attributed to reservoir compaction resulting from the man-made stress induced in the subsurface rock type, porosity, grain geometry, mineralogy, and cementation (Holzer, 1984). Fluid-filled oil reservoirs drilled during production are engineered with springs or casings that will compact if not properly supported during declines in pressure, and will cause failures, fractures and faults across underlying rock formations resulting in surface soil movement. The differential horizontal earth movement exhibited during surface subsidence can result in damage to surface structures including buildings, bridges, railroad tracks, and pipelines. Existing literature notes that the large-scale subsidence exhibited in areas such as the Wilmington Oil Field near Long Beach and at the Inglewood Oil Field and coastal fields in Los Angeles County can be attributed to the difficulty in predicting and controlling for the incidence of maximum subsidence over the long histories of oil drilling activity (Holzer, 1984). The environmental degradation of subsurface rock formations and impacts to groundwater are key areas for future environmental remediation.

CASE STUDY: BALDWIN HILLS RESERVOIR

The Baldwin Hills Reservoir was constructed in 1951 to provide water to the south and southwest portions of Los Angeles County in what is now Kenneth Hahn Recreation Area (located across La Cienega Boulevard from the Inglewood Oil Field). The dam suffered a disastrous breach in 1963 that resulted in flooding that killed five people and caused \$11 million in property damages.

When the dam was drained after the incident, it was revealed that the asphalt liner between the embankment and reservoir's contents had cracked, allowing water to penetrate and erode the soil beneath it which consisted of loose, sandy soil and large block-like rock formations typical of the area (Baldwin Hills Dam, 2020). Engineers determined that the crack could have been caused by the movement of the schist (or fault) below the dam, a combination of this natural phenomenon and the injection of pressurized liquid into the oil field near the dam, or movement from heavy equipment used during construction (Baldwin Hills Dam, 2020). This tragic outcome is illustrative of the Hills' land use limitations due to unique environmental conditions.

Figure 7. Aerial view of flooding caused by the breaching of the Baldwin Hills Dam, Dec. 1963.



Source: Association of State Dam Safety Officials.

Brownfield Redevelopment

Due to the few comparable case studies available, this project adopts a similar evaluation metric as the ones proposed by Carletta et al. (2014) and Goldstein et al. (2001), while taking notes from Osmundsen and Tveteras (2003) on innovative ways to redevelop land and potentially recycle leftover facilities. In a similar vein, earlier work by Bacot and O'Dell (2006) established a framework of indicators useful for analyzing local government brownfield redevelopment.

There is no consensus framework for large land parcel decommissionings, however individual case studies provide insight into possible approaches. Carletta et al. (2014) study the potential for decommissioning large tracts of surplus land held by government agencies or other organizations. An interplay of social, economic, environmental, and ecological factors are considered – this is considered within the site, local area, and region, within a land use and planning framework. Specifically, they provide guidance through addressing socioeconomic resources, current land use, and ecological factors, to determine overall suitability. Checklists for determining the best disposition of large tracts of decommissioned land were created, reviewing site suitability in terms of initial decision and specific alternatives.

Established criteria ranging from level of contamination to suitability of site, and even restrictions resulting from remediation and institutional controls, serve as a basic framework for considerations regarding potential land decommissioning initiatives. Goldstein et al. (2001) review the circumstances that create urban brownfields and develop alternative policy mechanisms that promote redevelopment and neighborhood revitalization. They address the various barriers to redevelopment, in particular the financial, regulatory and institutional, physical, and individual. In applying best practices from several case studies, Goldstein et al. make suggestions for the involvement and approaches of various stakeholders – particularly the inclusion of community organizations in the planning process, especially when developing into a public resource (2001).

Literature on the decommissioning of former highly contaminated sites, including power reactors and petroleum installations, can provide insight into challenges from potential hazards. Lochbaum (2014) reviews case studies of experiences in shutting down power reactors, highlighting pitfalls in federal policy in regulating the storage of contaminated waste. Aside from gaps in the formal decommissioning process, there are difficulties in length of time, cost, and monitoring within the various approaches (do it yourself, wait and see, calling in the decommissioning cavalry) applied by the case studies cited. Osmundsen and Tveteras (2003) tackle the underlying policy issue of decommissioning petroleum using a Norwegian perspective, looking into the reuse of offshore petroleum fields as artificial reefs as one alternative. The use of these alternatives show how redevelopment proposals can be creatively applied to former oil drilling sites.

Table 1 summarizes what we found to be the key criteria for redevelopment mentioned across these studies, including justification for why it should be included. Specific examples of how these criteria were applied in different redevelopment case studies were taken from Laraia (2019), though this source focused on the reuse and redevelopment of nuclear sources rather than petroleum.

Table 1. Decommissioning and redevelopment evaluation criteria and application to relevant case studies

Criteria	Justification	Example
Level of contamination	Depending on the prior or current use, the redevelopment potential and cost may change	---
Health, safety, and environmental impacts	Existence, redevelopment, and construction of the new use should not negatively impact health, safety, or the environment	---
Economic viability and community support	Should include steps for achieving just transition and support former workers either through retraining or other ways to meet the overarching goals of the city Includes community engagement in making decisions on what use is appropriate and how to achieve it	In 2017, the EPA found that 75 businesses at the Denver Radium Superfund Site were estimated to employ 1125 people and generated \$282 million in annual sales revenue. The Fernald community was a constructive stakeholder in the cleanup process, with a citizens group called the Fernald Residents for Environmental Safety and Health. This group educated and represented the greater community, were involved in decision-making processes, and participated in national discussions on nuclear waste. Fernald Citizens Advisory Board was created to address the more technical aspects.
Suitability of site	Depending on level of contamination and the subsequent intensity allowed or restricted, this may impact the suitability of the site for certain uses	San Francisco Trust for Public Land (TPL) launched a campaign to turn landfills into parks. This is difficult due to issues of toxicity, liability, and ground settlement arising from landfills as opposed to a greenfield.

Restrictions resulting from remediation and institutional controls	<p>Based on the level of contamination onsite, even intensive remediation may not be sufficient</p> <p>This may restrict certain land uses, particularly sensitive ones due to local, regional, or even national regulations</p>	<p>Residents of Hunters Point Naval Shipyard are not allowed to grow edible plants, some areas prohibit more sensitive land uses such as hospitals and schools. Areas that cannot be fully decontaminated will be covered up and capped.</p> <p>The Heritage Minerals Site initially proposed building a new community of 2450 homes on the old quarry. However, more stringent criteria was passed by the NJ Department of Environmental Protection than the NRC criteria. The contaminated area was ultimately restricted to green space or recreational activities.</p>
Accountability	In the case that not all wells are properly abandoned or the land is not sufficiently remediated, the city may need to determine their accountability in the process	Home Depot concerns for company responsibility of site contamination at Denver Radium Superfund Site resulted in Prospective Purchaser Agreement (PPA) and Covenant Not to Sue.
Stakeholder involvement	Requires the identification of stakeholders, whether local or regional, and ways to coordinate efforts between them	Yankee Rowe Nuclear Power Station decommissioning was facilitated through a Site Closure Project Plan (SCPP, which acted as a tool for stakeholder interactions.

Source: Laraia, M. (2019). Beyond Decommissioning: The Reuse and Redevelopment of Nuclear Installations. United Kingdom: Elsevier Science.

In terms of funding, Bacot and O'Dell (2006) have identified economic and environmental criteria useful for evaluating redevelopment through the lens of local government brownfield programs. They find that property values, private investment, public investment, and grant funding are common components of successful programs, in addition to reduction of pollution

levels. In an assessment of the Charlotte Brownfield Program in North Carolina, it resulted in more opportunities and investment directed to the urban core. From these findings, Bacot and O'Dell suggest that there is potential for brownfield redevelopment programs and local enviroeconomic policies in offering economic and environmental benefits to cities with many underused properties (2006). While these same programs and resources are not available in every city, it highlights the potential for both environmental mitigation and catalyzation of urban redevelopment – if strategically planned.

Housing Market

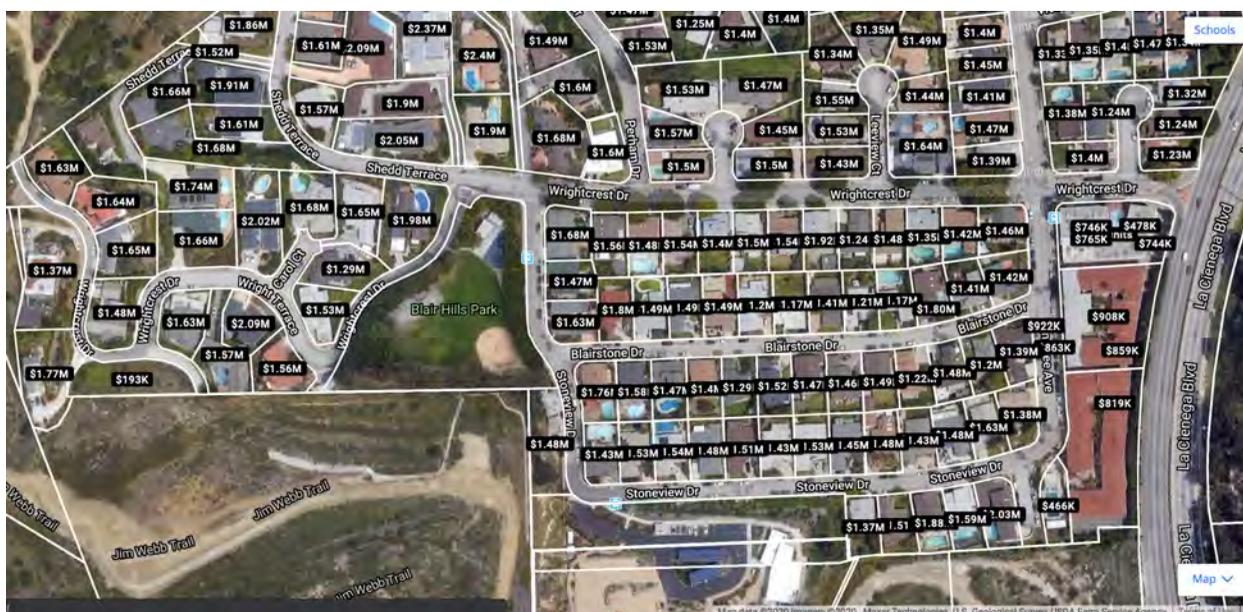
Scholars have sought to better understand the impact of brownfield redevelopment within the context of highly dense urban areas, and particularly, the estimated effects on housing values. Although substantive literature is scarce in the field of urban oil site redevelopment, scholarly work evaluating urban brownfield redevelopment has found clear connections between the redevelopment of natural resource development sites and neighboring housing values.

Evidence suggests that local government brownfield redevelopment is an effective policy tool for cities to remove sources of blight from abandoned or former industrial uses into housing and other amenities (De Sousa et al., 2009). Despite early perceptions that brownfield redevelopment influence on housing values is determined by publicly-assisted efforts, it has been shown that factors such as proximity to major roads and higher incomes have greater positive impacts (De Sousa et al., 2009). This suggests that although publicly-assisted efforts may be better suited to address the inherent complications in brownfield redevelopment, site location and geography continues to play a paramount role in the effectiveness of a planned redevelopment project.

Research signals that before a process of brownfield redevelopment, oil and gas drilling is responsible for negative effects on nearby housing values. A study in Pennsylvania found that the presence of shale gas development made nearby homes less valuable (Muehlenbachs et al., 2015). Hedonic estimates were used to suggest that property values were 10% lower if located near a shale gas development, though this number varies depending on water source, well productivity, and visibility. The authors acknowledge limitations related with accurately estimating the presence of correlated unobservables which may confound identification. However, distinctions between groundwater-dependent homes and piped-water dependent homes allowed researchers to determine that perceived risks of groundwater contamination have materialized into a real impact on perceptions of value (Muehlenbachs et al., 2015).

The Inglewood Oil Field is located on hills set apart from local city and county neighborhoods by a narrow green, open space boundary easily perceived as a park. However, oil drilling derricks can be seen at a distance in most locations. The shale gas development study focused on properties in Pennsylvania's hilly and mountainous geography, and controlled for the fact that those homes afforded a view of wells within the adjacency buffer (Muehlenbachs et al., 2015). A parallel effect can be inferred for the nearby Blair Hills residential neighborhood that abuts the IOF boundary. Figure 8 below maps recent home values for homes in the Blair Hills neighborhood of Culver City.

Figure 8. Housing Values in Blair Hills, Culver City



Source: Zillow. "Culver City Home Prices & Values." Accessed February 3, 2020.

Research by De Sousa et al. (2009) and Kaufman et al. (2006) indicate that brownfield redevelopment of the Inglewood Oil Field would contribute to an increase in nearby home values. A study conducted in the cities of Milwaukee and Minneapolis found that redevelopment leads to a net increase of 11.4% and 2.7% respectively, in urban areas that choose to pursue brownfield remediation (De Sousa et al., 2009). The net increase in home values was further supplemented by other urban infrastructure investments such as the expansion of a light rail line in the case of Minneapolis. Furthermore, a study of the Lincoln neighborhood in Kenosha, Wisconsin, found that remediation of a brownfield would raise property values for a nearby representative house by 1.7% to 6.2%, whereas remediation and conversion to green space together would raise values by 3.4% to 10.0% (Kaufman & Cloutier, 2006). This research indicates that an immediate economic benefit of remediation and redevelopment will be reflected in nearby home values increasing. This topic poses further considerations for Culver City, in terms of whether they should pursue some form of value capture of this passive gain realized by homeowners near the Inglewood Oil Field.

Although shale gas development has a demonstrated negative impact on home values in Pennsylvania, the current high valuation of land in Culver City is in part due to its location within Los Angeles County – despite its proximity to the Inglewood Oil Field. The average listing price for a home in Culver City is \$1.2 million, while the home values indicated

above in Blair Hills are considerably higher. In comparison, the median home value in Los Angeles County is currently \$638,484 (Zillow). Based on existing research, we know that other hedonic factors are associated with the current valuation of the land in Culver City located near the oil field. In the case of Blair Hills, the residential neighborhood is in close proximity to a major road (La Cienega Blvd), is within walking distance to a neighborhood park and nature preserve (Blair Hills Park and Stoneview Nature Center), and homes are afforded views of the surrounding urban region due to its hilly terrain. The evidence suggests that a redevelopment of Culver City's portion of the oil field will serve to increase home values in the Blair Hills neighborhood.

It is worth noting that a far greater number of homes within Culver City are adjacent to the Inglewood Oil Field along the County's border. In other words, the Blair Hills neighborhood stands to benefit from a scenario of potential oil field redevelopment, but Culver City homes in the Raintree neighborhood for example, will continue to be subject to the effects of policies and management of the neighboring unincorporated County Inglewood Oil Field.

CASE STUDIES OF FORMER BROWNFIELD DEVELOPMENT



We present four successful case studies of former brownfield redevelopment projects in the Southern California region in order to better evaluate a potential decommissioning and redevelopment of the Inglewood Oil Field under Culver City jurisdiction. The decommissioning matrix below estimates potential cost and land use intensity for various redevelopment scenarios. The level of proposed land use intensity is evaluated against the projected remediation and development cost. For example, redeveloping into open park space will feature both a lower development cost and land use intensity than a higher intensity land use such as a single- or multi-family residential development.

The evaluation criteria for project intensity fall into specific categories and examples that describe levels of contamination, economic viability, suitability of site, regulatory restrictions, and stakeholder involvement. In addition to the specific criteria and examples listed below, there are four successful redevelopment sites within or near the County of Los Angeles that can be applied to our analysis.

Table 2. Decommissioning matrix estimating potential cost of remediation and land use development intensity

	LOW INTENSITY	MEDIUM INTENSITY	HIGH INTENSITY
LOW COST	Open space: <ul style="list-style-type: none"> ● Park space ● Playground 	Community: <ul style="list-style-type: none"> ● Recreation ● Meeting space 	---
MEDIUM COST	Multifunctional resource: <ul style="list-style-type: none"> ● Green infrastructure ● Sports field ● Restoration Other: <ul style="list-style-type: none"> ● Parking structure 	Institutional: <ul style="list-style-type: none"> ● Schools ● Government buildings 	Commercial, Mixed-Use: <ul style="list-style-type: none"> ● Office space ● Studio Space
HIGH COST	Passive energy generation: <ul style="list-style-type: none"> ● Solar panels ● Energy storage ● Wind turbines 	Commercial, Mixed-Use: <ul style="list-style-type: none"> ● Shopping malls ● Research parks 	Residential: <ul style="list-style-type: none"> ● Single-family homes ● Apartment complexes

The four case studies offer useful lessons on how previous developers and jurisdictions have approached the challenges facing remediation and redevelopment – this includes improperly abandoned wells at the Larry Itliong Village and economic value increases arising from more effective land utilization, as witnessed in the urban retail at The Grove.

In the case of the Larry Itliong Village, Development Director Takao Suzuki underscores the importance of properly adhering to the formal approval process, defining liability, and ensuring sufficient contingency measures (T. Suzuki, personal communication, April 16, 2020). The formal approval process may involve several agencies, depending on the initial environmental assessment of potential contamination to soil and groundwater. Ultimately, unless the proposed development meets LA County requirements, it cannot move forward. On the other hand, the city needs to define who takes over the liability for remediating the oil field. The Polanco Act provides immunity from liability for redevelopment agencies and subsequent property purchasers for sites cleaned up under a remediation plan approved by DTSC – and Culver City will need to plan accordingly to determine who is responsible for this and where the city’s liability ends. Lastly, if the city decides to undertake remediation, it will be prudent to double or even triple contingency into negotiations with oil abandonment companies. As seen with the Larry Itliong Village, two improperly plugged wells were discovered near project completion. Having insurance can be beneficial with regards to unforeseen circumstances or negligence in oil well abandonment procedures.

The case of the Grove Shopping Center highlights the potential for turning former oil drilling land into a more efficient and economically productive use. The combined \$113 million in sales and property tax generated by The Grove in 2016 well exceeded the \$2.3 million of oil generated by the oil field in the same year – let alone the taxes received by the City of Los Angeles. An important thing to keep in mind are the mineral rights royalty holders who benefit from oil extraction, and their potential opposition to the decommissioning of the oil field. In terms of remediation, Pacific City in Huntington Beach utilized a minimally intrusive approach for well abandonment. Terra-Petra provided insight into the types of tests required, since they relied on feasibility studies that evaluated subsurface issues, soil sampling, gas monitoring, and groundwater testing among others. Their familiarity of the regulatory agency landscape allowed them to design a remediation plan that was most cost-efficient for their developer client while still following acceptable remediation requirements.

The Villages at Heritage Springs townhome development in the City of Santa Fe Springs is most comparable to the Culver City portion of the Inglewood Oil Field by project site acreage. The project site is approximately 54-acres and saw over 100 years of oil production history. The former oil field was owned by a patchwork of land owners and mineral rights holders before the City of Santa Fe Springs bought every parcel in 2005, thus consolidating ownership. The city paid for an environmental assessment and remedial action plan in compliance with local regulations before turning over the property to a private developer. The developers followed DTSC requirements for environmental remediation and redevelopment in order to build residential townhomes. The environmental remediation team identified over 130 areas of concern during the Phase II assessment and removed nearly 76,000 tons of hydrocarbon-impacted soil. While this is informative, the hilly terrain of the Inglewood Oil Field makes the remediation context quite distinct from Santa Fe Springs, which is characterized by a flat and level topography. There may be a large variation in the amount of soil that needs to be removed given Culver City's geography and topology. However, the process of decommissioning and turnover to private developers can serve as a comparable development process – if Culver City chooses to move forward with a non-publicly assisted site redevelopment.

Case Study 1: Larry Itliong Village, Los Angeles, CA

Background

The Larry Itliong Village is a mixed-use affordable housing development built on a former oil drilling site, through a partnership between the Pilipino Workers' Center (PWC) and the Little Tokyo Service Center (LTSC) Community Development Corporation. Environmental Protection Agency Brownfields funding was used to remediate the site. The oil wells were in operation between 1930 to 1970, and the project site redevelopment was completed in 2014. Larry Itliong Village is home to the office of community-based non-profit, Pilipino Worker's Center, as well as 45 affordable housing units, a community center, and multipurpose gymnasium.

Redevelopment Considerations

Takao Suzuki, the Director of Community Economic Development with LTSC, highlighted several challenges: the formal approval process, costs undertaken by the developer, city liability, and public sentiments on the proposed use (T. Suzuki, personal communication, April 16, 2020). Before the process of remediation begins, a thorough assessment of the wells in the oil field must be conducted. County records, specifically the documentation of oil wells registered with DOGGR, may not be entirely accurate or all encompassing. This issue arose during the last

stages of construction when two unsurveyed wells were found near the project site sidewalk. Environmental consultants are in charge of the site assessment and cost estimation for the oil field, with all reporting, monitoring, and other lab studies sent to LA County Fire and CalGEM (formerly known as DOGGR). Project approval is contingent upon meeting the requirements set forth by LA County Fire, otherwise the development cannot move forward.

On the other hand, negotiations between the city and developer must determine whether the developer will take on the cost of abandonment and remediation. In terms of liability, it may be less risky for the city to transfer as much of the liability and cost of remediation to the developer. Aside from the formal approval and permitting procedures, issues can arise during the construction phase – such as the two improperly abandoned wells discovered near project completion. To address these unforeseen circumstances, having a contingency budget and insurance policy to cover all costs would be prudent.

Recent reports on the safety of formerly remediated sites suggest that brownfields should not include residential uses. Depending on local community sentiments, less sensitive and intensive uses such as solar, wind, or open space may be preferred.

Figure 9. Larry Itliong Village and Pilipino Worker's Center.



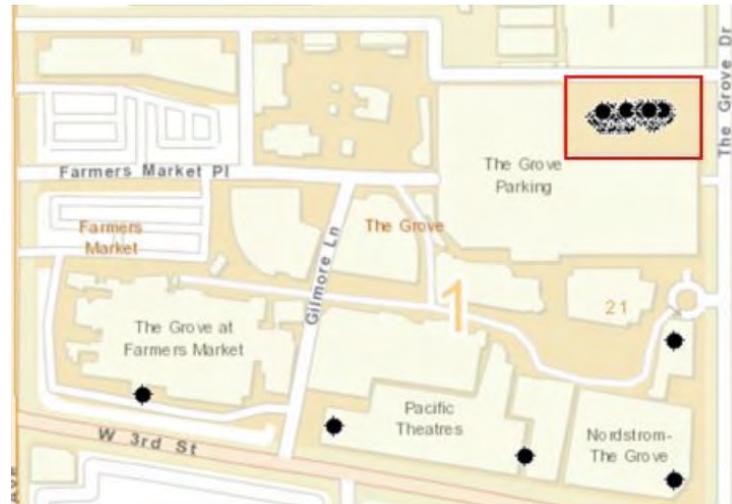
Source: Courtesy of Little Tokyo Service Center.

Case Study 2: The Grove Shopping Center, Los Angeles, CA

Background

The Grove is a successful retail development built on top of a former Salt Lake Field oil drilling site. Figure 10 maps some of the 42 oil wells that were in operation until 2000, producing 61,000 barrels of oil worth approximately \$2.3 million in 2016 (Liberty Hill Foundation, 2018). In the same year, the Grove generated an average annual sales of \$1.2 billion, as well as \$2 million in property taxes and \$111 million in sales tax – far exceeding the potential income of oil drilling operations.

Figure 10. The Grove Shopping Center, former location of oil wells marked.



Source: Courtesy of STAND-LA.

Economic Value

The Grove is an example of economically efficient land utilization. Taking into consideration the landscape of Los Angeles County, and particularly the boundaries of Culver City, large parcels of undeveloped or underdeveloped land are rare. In redeveloping an underutilized oil drilling site, the shopping center received over thousands of times more in taxes than the estimated revenue of oils in 2016. This may suggest a high baseline potential for the Culver City portion of the Inglewood Oil Field, with 77.8 acres that can be flexibly divided into revenue and non-revenue generating uses.

The Grove project site was acquired in July 1997, with construction starting in December 2000 after obtaining approval in May 2000. Some concerns at the time included removing a potential energy source during the 2001 perceived energy crisis, as well as the end of payments to nearly 1,000 royalty holders who held land above the Salt Lake Field (Landsberg, 2001). A major justification for redevelopment was the increased costs associated with oil extraction — as the oil closer to the surface was retrieved, more technology investments were needed to drill even deeper.

As noted in an article by the LA Times, oil companies have found that the challenges of urban oil drilling can bury the profit (Landsberg, 2001). This was the case in 2001, and the costs are likely more pronounced nowadays given the new regulations and safety measures in place. Other considerations include methane gas, since there was a leak-related explosion in the area in 1985.

Case Study 3: Pacific City, Huntington Beach, CA

Background

Pacific City is a housing and retail space built on a former oil drilling site. The environmental contractor, Terra-Petra, managed the environmental remediation and well abandonment procedures for the project. The former oil drilling site was most likely operated by Chevron USA between 1920 to 1990. The development is built on a 17-acre site, on top of 15 former wells.

Remediation and Redevelopment Considerations

In order to maintain maximum cost-viability, the environmental consultant team at Terra-Petra prepared a minimally intrusive remediation approach for their client. This approach involved capping each well between 6 to 10 feet below surface grade, recapping each well head with a metal plate, and installing a methane mitigation vent cone at each well head (D. Lucero, personal communication, April 23, 2020). In order to present this remediation alternative, Terra-Petra relied on feasibility studies that evaluated subsurface issues, soil sampling, gas monitoring, and groundwater testing among other considerations. Their familiarity of the regulatory agency landscape allowed them to maneuver a remediation plan that was most cost-efficient and followed acceptable remediation requirements.

The oil regulations for well abandonment in the City of Huntington Beach are straightforward and defer to CalGEM standards (City of Huntington Beach, June 2017). The city has also recently introduced a draft Local Hazard Mitigation Plan that references past issues of oil well drilling and abandonment activities, but does not make firm recommendations regarding the future hazard mitigation (City of Huntington Beach, March 2017). This is noticeably lacking, since an abandoned oil well spurted approximately 300 gallons of petroleum and methane gas in 2004. This event affected 360 homes and resulted in property damage, though there were no reported injuries (Daniels, 2004).

Figure 11. Rendering of Pacific City.



Source: Courtesy of Terra-Petra.

Case Study 4: Villages at Heritage Springs, Santa Fe Springs, CA

Background

Villages at Heritage Springs is a green residential townhome development on a former oil production site, which underwent a two-year remediation process. Waterstone Environmental, Inc. was brought on to conduct a feasibility study, including cost options for remediation. The development site is 54-acres and has a 100-year oil production history.

Remediation and Redevelopment Considerations

The former oil field was owned by a patchwork of land owners and mineral rights holders before the City of Santa Fe Springs bought every parcel in 2005. The city paid for an environmental assessment and remedial action plan in compliance with local regulations prior to turning over the property to a private developer. The developers followed DTSC requirements for environmental remediation and redevelopment in order to build residential townhomes. The environmental remediation consultant prepared a Preliminary Endangerment Assessment, Feasibility Study, Remedial Action Plan and Conceptual Site Model Study (Waterstone Environmental, Inc., n.d.). In keeping with established DTSC brownfield redevelopment procedures, the project studies required community input and revisions.

The environmental remediation team identified over 130 areas of concern during the Phase II assessment, which culminated in the removal of approximately 76,000 tons of hydrocarbon-impacted soil (Waterstone Environmental, Inc., n.d.). The cost estimates for this particular case study are useful due to the similar size of the Heritage Springs development in Santa Fe Springs to the Culver City portion of the Inglewood Oil Field. Furthermore, Santa Fe Springs is a mid-sized city with a long history of oil well production. Despite this redevelopment, active oil drilling continues in separately owned property lots nearby to the Village at Heritage Springs development.

DATA ANALYSIS: REDEVELOPMENT POTENTIAL OF CULVER CITY'S OIL FIELD

This section applies the redevelopment evaluation criteria established in Table 1, decommissioning matrix from Table 2, lessons learned from case studies, and research gathered regarding formal decommissioning requirements. It links these agencies and stakeholders together, in Table 3 to inform Culver City of the legislative processes as well as environmental and structural limitations that require consideration.

Table 3. Agency or stakeholder involvement within the decommissioning and redevelopment process

Agency or Stakeholder Involvement	Decommissioning and Redevelopment Process
CalGEM	All reporting, monitoring, lab studies must be sent Abandonment and re-abandonment approval based on their decision Has records available to determine number and location of oil wells on site, thought not always conclusive
LA County Regional Planning	County of Los Angeles Board of Supervisors can coordinate departments and jurisdictions to discuss joint remediation effort between Culver City and Unincorporated Los Angeles County
LA County Fire Department	Dependent on schedule availability, site mitigation and soil All reporting, monitoring, lab studies must be sent Must meet requirements to receive final approval for project
LA Regional Water Quality Control Board	Groundwater contamination projects
Department of Toxic Substances Control	Sets requirements and processes for brownfield and environmental remediation
Southern California Air Quality Management District	A 1166 permit required for soil excavation, since emission standards limit the tons of contaminated soil to be moved per day
Los Angeles Department of Building and Safety	Established Level 1 through 5 requirements for construction of methane mitigation installations
Local stakeholders: - Culver City residents - Sierra Club - STAND-LA	Community engagement and feedback to determine appropriate use

Scope of Study

The scope of our research spans legal, financial, and physical areas of expertise. The multidisciplinary aspect of decommissioning the Inglewood Oil Field arises from complex interactions involving local history, stakeholders, and interests. To provide a comprehensive report on the impacts of decommissioning and potential for redevelopment, we have analyzed relevant conditions within legislative, health, environmental, and economic areas.

Legislation

Underlying the historic presence of oil fields in Los Angeles County is a legislative framework that previously enabled these operations to proliferate. To understand the current regulatory setting with regards to oil and gas operations, we have compiled existing policies on the state, county, and city level (Psonas, 2017). With regards to Culver City, the Conservation Element set forth in the General Plan addresses the political environment in which oil practices commenced, whereas recommendations for future uses should align with updated objectives of the plan. Table 4 presents the different levels of governance, including their associated frameworks and jurisdiction.

Table 4. Jurisdiction and framework within each level of governance

Level	Jurisdiction	Framework
Federal	US Department of the Interior, Bureau of Land Management	Oversees oil and gas drilling activities on federal land
State	California Geologic Energy Management Division (CalGEM)	Regulation of oil and gas drilling activities on non-federal land is under state regulatory authority
	California Air Resource Board (CARB)	Taxes on greenhouse gas emissions, air emissions studies
	South Coast Air Quality Management District (SCAQMD)	Gathers air quality related information on oil and gas drilling
	Department of Toxic Substances Control (DTSC)	Oversees remediation procedures
County	Baldwin Hills Community Standards District (CSD)	Implements regulations on oil drilling practices
City	Culver City Municipal Code (Chapter 11.12. Oil, Gas and Hydrocarbons)	City is preempted by state in controlling how oil and gas activities occur, but has land use authority
Other stakeholders	STAND-LA Sierra Club	Grassroots organizations calling for decommissioning the Inglewood Oil Field

State

The responsibilities of CalGEM are codified in the California Code of Regulations (CCR Title 14, Chapter 4) and the California Public Resources Code (PRC Section 3000). CalGEM is mandated to supervise the drilling, operation, maintenance, and abandonment of oil wells for the purpose of preventing the following: (1) damage to life, health, property, and natural resources; (2) damage to underground and surface waters suitable for irrigation or domestic use; (3) loss of oil, gas, or reservoir energy; and (4) damage to oil and gas deposits by infiltrating water and other causes (Psomas, 2017).

In November 2019, Governor Gavin Newsom blocked approvals for new hydraulic fracking permits pending a scientific review, and imposed a moratorium on new permits for steam-injected oil drilling across the state (Willon, 2019). In the same week, the governor commissioned a report to study suggested setback requirements for residential areas. In January 2020, the Office of Governor Newsom filed a federal lawsuit to prevent the Trump administration from opening 720,000 acres between the Bay Area to Fresno for the expansion of oil drilling (Alexander, 2019). These actions were early indicators that the governor was considering policies to shift California away from dependence on natural gas and oil drilling towards stronger regulatory oversight and green industry.

However, the COVID-19 pandemic will most likely hinder these goals for the regulation of the oil drilling industry in California. Newsom, as part of his initial 2020-21 state budget, proposed adding 128 analysts, engineers, and geologists to CalGEM over the next three years. Oil producers would have been required to pay \$24 million to fund the expansion, but this proposal may change due to state budget shortfalls resulting from the pandemic (Goldberg, 2020). Additionally, the California Independent Petroleum Association (CIPD) has begun to lobby the governor's office to amend the proposal, pointing to the historically low prices of oil which are making it difficult for many operators to continue.

County

The Inglewood Oil Field located in unincorporated Los Angeles County is subject to the guidelines set forth in the Baldwin Hills Community Standards District. The County began the process of developing a new oil well ordinance that would apply to all oil drilling operated in unincorporated areas of the County, with the exception of the Inglewood Oil Field. For this reason, the Baldwin Hills Community Standards District will remain in effect for the County portion of the oil field, and will continue to be overseen by the BHCSO Community Advisory Panel. In terms of procedures and requirements, the Los Angeles County Oil and Gas Inventory Report states that the Baldwin Hills CSD Compliance Requirements includes the following (MRS Environmental, 2015):

- Submittal of compliance plan reports and records
- Submittal of operational and maintenance records
- Environmental Quality Assurance Program (EQAP)
- Onsite inspections by an Environmental Compliance Coordinator (ECC)
- Oversight under a Multi-Agency Coordination Committee (MACC)
- Public complaint investigation and follow-up procedure
- Periodic review of the environmental mitigations as found in the permit requirements

For the periodic review, it is undertaken every five years to check the compliance of permit conditions. The purpose of this is to determine whether the provisions required by the permit are sufficient in terms of protecting public health and safety. These reviews for the Baldwin Hills Inglewood Oil Field were last completed in September 2015 and reported positive results (MRS Environmental, 2015).

In 1986, the Los Angeles County Certified Unified Program Agency (LACoCUPA) established a Site Mitigation Unit (SMU) within the Fire Department. The SMU operates a voluntary oversight program as per Health and Safety Code §101480, which allows the oversight of certain contaminated sites. In May 2008, the Department of Toxic Substances Control (DTSC) delegated corrective action oversight authority to LACoCUPA under Chapter 6.5 of Division 20 of California Health and Safety Code to implement corrective action under consent agreement at CUPA facilities within its jurisdiction. The jurisdiction of LACoCUPA includes most cities in Los Angeles County, with the exception of El Segundo, Glendale, Long Beach, Santa Fe Springs, and Vernon. The SMU voluntary oversight and corrective action oversight programs are offered in addition to DTSC and Regional Water Quality Control Board (RWQCB) oversight programs for those seeking cleanup of contaminated properties.

Culver City

As mentioned previously, the Inglewood Oil Field is shared between unincorporated Los Angeles County and Culver City. A boundary map of the Baldwin Hills CSD can be found in Appendix A. Although the unincorporated portions of the field are regulated by the Baldwin Hills Community Standards District, Culver City along with other jurisdictions sued the County in 2008. They stated that the CSD was inadequate and eventually won a strengthening of the guidelines (Psomas, 2017). Culver City last updated its oil drilling regulations in 2003, which regulates oil and gas drilling within their city limits through Culver City Municipal Code (CCMC) Chapter 11.12, Oil, Gas and Hydrocarbons (City of Culver City, 2017). The commissioned amortization study curtailed the continued adoption of new regulations in the interest of studying the potential decommissioning of the City IOF.

The LACoCUPA and Culver City Fire Department share responsibility for the regulatory programs concerning hazardous waste and site mitigation. Table 5 below identifies the CUPA program elements as required under Senate Bill 1082, which consolidated the administration of six hazardous materials and waste programs called program elements under one agency, Certified Unified Program Agency (CUPA) (Culver City Fire Department, n.d.).

Table 5. CUPA Hazardous Materials and Waste Program Elements in Culver City

LACoCUPA	Culver City Fire Department
Hazardous Waste Generator and Onsite Hazardous Waste Treatment Programs	Hazardous Materials Release Response Plans and Inventory Program (Hazardous Materials Disclosure)
Aboveground Petroleum Storage Tank Spill Prevention Control and Countermeasure Plan	California Accidental Release Prevention Program (CalARP)
Underground Storage Tank Program (UST)	---
Uniform Fire Code Plans and Inventory Requirements	---

Health

In recent years, there has been an increase in evidence on the negative health impacts caused by oil extraction operations (Liberty Hill Foundation, 2015; LA Office of the Controller, 2018). Though oil drilling is an established practice in the County of Los Angeles, the associated health consequences were previously not well known. The results of public health studies have mobilized local stakeholders and coalitions towards decommissioning the Inglewood Oil Field and against the current oil operator of the site, Sentinel Peak Resources.

As part of the settlement agreement in which Culver City and other jurisdictions successfully sued to strengthen the regulatory oversight provided by the LA County CSD, the Los Angeles County Department of Public Health (LACoDPH) is required to complete an annual Health Assessment and Environmental Justice Study. According to a memorandum from the hired consulting firm (MRS Environmental) to LA County Regional Planning, the LACoDPH will conduct the 2020 study in three phases. The study will be prepared in consultation with members of the BHCSO Community Advisory Panel (MRS Environmental, 2019). The first study found that no determination could be made regarding whether exposures to chemicals from IOF operations directly affected health outcomes for those living nearby. This study will be aligned with the CARB SNAPS Study as the data becomes available. The completed study will aim to uncover the relationship between the Inglewood Oil Field and health outcomes for those living nearby.

Environment

Aside from health, environmental factors such as soil degradation and groundwater contamination can influence the redevelopment potential of the Inglewood Oil Field. A comprehensive draft Environmental Impact Report (EIR) is available, but further testing is necessary to determine the current conditions of these resources. The case studies above provide insight on the types of problems that may arise from redeveloping former oil fields and how this may change the feasibility of certain projects – ranging from unsurveyed wells to explosions resulting from gas leaks, or even continued operation of oil wells near the redeveloped site. Additionally, this offers an idea on what oil field redevelopment projects have been undertaken and whether they have been successful, from mixed-use affordable developments to urban retail.

Economic Impact

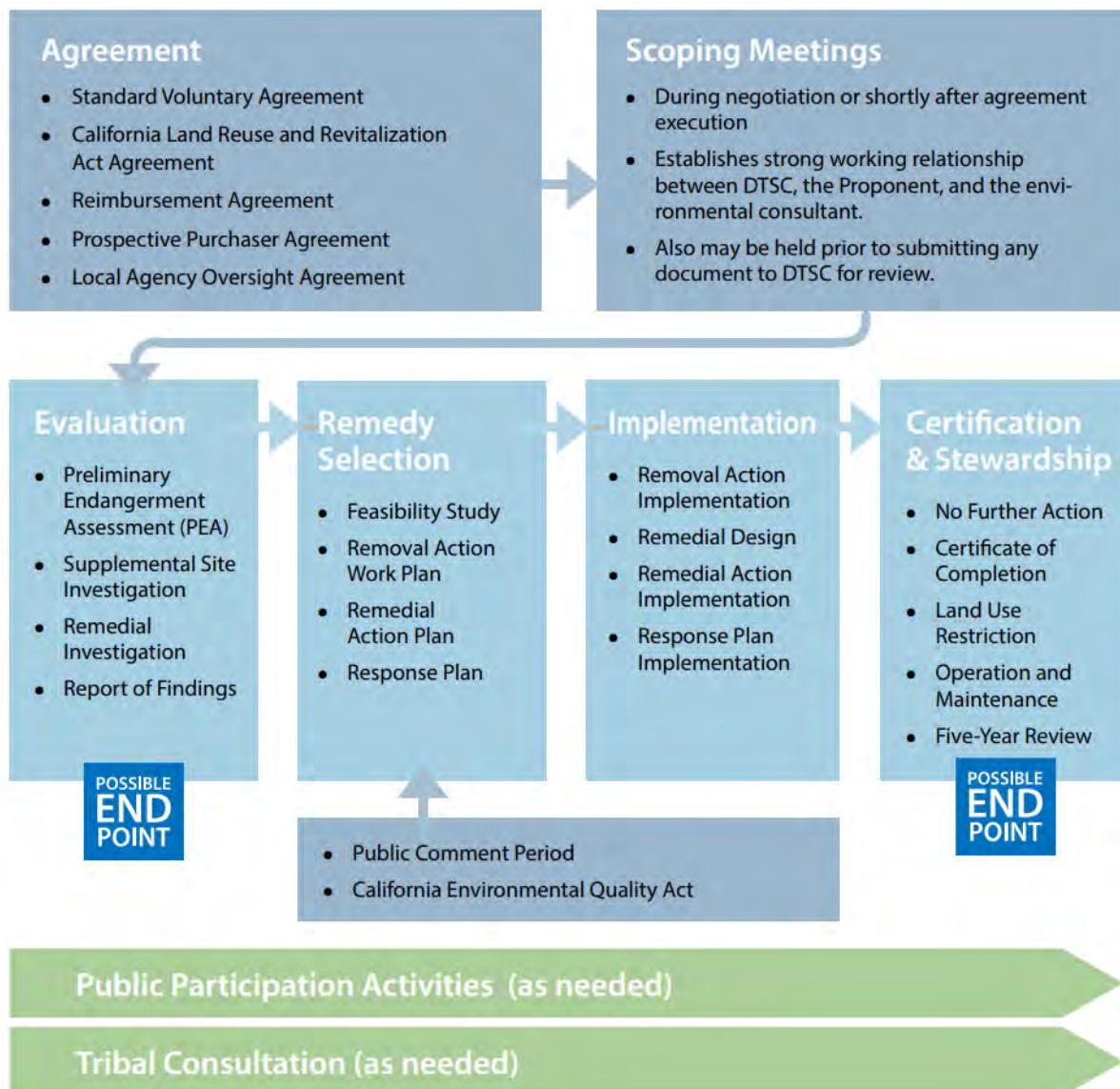
Though the Culver City portion of the oil field accounts for 77.8 acres, the Inglewood Oil Field in its entirety comprises 1,000 acres of land. The process of decommissioning and redeveloping the oil field will face jurisdictional decisions based on the reconciliation of the Culver City and unincorporated Los Angeles County IOF. Culver City may move forward with a plan to decommission their portion of the oil field, but city leadership will have to confront potential issues with subterranean oil drilling infrastructure that spans beyond the above-ground city boundary. In this case, a comprehensive governmentally aligned decommissioning approach for the field as a whole may be more successful than a piece-meal phasing out of the Inglewood Oil Field.

The question of lost tax revenue should the city move to decommission the oil field is difficult to assess without additional resources to research the number and royalty and property interests in the Culver City IOF. Sentinel Peak Resources owns the oil and gas drilling operation rights for the Inglewood Oil Field. Property ownership for the oil field consists of a patchwork of surface landowners and mineral rights holders. The surface landowners of the Culver City IOF own a combined total assessed value of \$31.2 million, as of 2019 LA County Assessor's Office records. They pay property taxes that are divided into the following local uses: West Basin Municipal Water District Standby Charge, Culver City School District, Community College District and Los Angeles County. However, enhanced access and data analysis into Culver City's royalty holders will provide a better understanding of potential lost revenues.

Remediation

The Santa Fe Springs case study is illustrative of the convoluted and long-term remediation process needed for brownfield redevelopment. The Waterstone Environmental consulting team prepared a Preliminary Endangerment Report, Remedial Action Plan, and Feasibility Study Report among other extensive soil and groundwater studies to prepare the site for remediation. Figure 12 below charts the possible courses of action required for brownfield redevelopment as defined by the California Department of Toxic Substances Control (DTSC).

Figure 12. Oversight and Engagement Process for Brownfield Development



Possible End Points:

1. Based on site evaluation, projects may conclude without need for any further action;
2. Based on site evaluation, projects may conclude with the need for a Land Use Covenant, in which case a public notice process will be implemented through a Preliminary Endangerment Assessment , Report of Findings, or equivalent documents; and,
3. Cleanups may either be conducted to unrestricted land use levels, or may require long term stewardship.

Source: DTSC Brownfields. (2018, December 5). DTSC’s Voluntary Agreements - Assessment & Cleanup Process Quick Reference Guide. <https://dtsc.ca.gov/brownfields/>

The DTSC Site Mitigation and Restoration Program provides regulatory oversight for the evaluation and cleanup of brownfields. DTSC uses the Environmental Protection Agency’s (EPA) definition of brownfields: “real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.” The prioritization of brownfield redevelopment in California has led the DTSC to create programs and administrative vehicles, which have supported formalizing and

streamlining the engagement and oversight process. This includes entering into Memorandums of Understanding (MOAs) in March 2005 with the State Water Resources Control Board, Regional Water Quality Control Boards, and the California Environmental Protection Agency. The MOAs were developed to ensure effective and expeditious investigation and cleanup of brownfield sites, in a manner that is protective of public health and safety and the environment. Additionally, this should follow all applicable regulatory requirements and demand the same rigor and scientific scrutiny to ensure the protection of human health and the environment (DTSC Memo, 2005).

The United States Environmental Protection Agency (US EPA) outlines guidelines for environmental remediation that require risk assessments and Preliminary Remediation Goals (PRGs). Generally, Regional Management Levels (RMLs) are higher levels than those selected as final cleanup levels at sites where remedial action may be required (EPA, 2020). In many cases, a site development project will go through several iterations in identifying the Remedial Action Plan (RAP) before local regulatory agencies select the final cleanup levels.

DTSC periodically develops modified screening levels based on US EPA Regional Screening Levels (RSLs) for use in the human health risk assessment (HHHA) process at hazardous waste sites and permitted facilities (EPA, 2020). The most recent RSLs for HHHAs were released in April 2019. These are not cleanup standards and cannot be used to determine whether no further action is required if concentrations fall below RMLs. Rather, RSLs use screenings to identify contaminants and conditions that may not require federal or state attention but which may need further study or investigation to determine if a cleanup is necessary.

Risk assessments conducted over the course of the site remediation process will inform the action required. Site-specific RSL screenings will evaluate the site for future land use so that the appropriate exposure pathways, parameters, and equations can be used to calculate risk-based Preliminary Remediation Goals (PRGs) (EPA, 2015).

Potential Funding Sources for Remediation

Department of Toxic Substances Control (DTSC) Grants

DTSC administers two grant programs and three loan programs that assist with the environmental assessment and clean-up of brownfields across the state. The COVID-19 pandemic has led to the postponement of many grant programs for the rest of 2020 but is anticipated to begin again in 2021 (DTSC TSI, 2020). See below for summaries of each program.

Brownfields Revolving Loan Fund (RLF) Program

The Brownfields Revolving Loan Fund (RLF) Program offers eligible government entities or other parties (such as site owners or developers, as long as they are not responsible for the contamination), low-rate loans for the cleanup of brownfield sites so they can be redeveloped (RLF Fact Sheet, 2016). If the site is a governmental agency, tribal entity, or nonprofit organization, they may also apply for grants of up to \$200,000 per site. A site assessment and remediation plan must be completed prior to application, and there should be no pending state or federal legal action at the site. The site must also not be currently owned by a party responsible for environmental remediation.

Cleanup Loans and Environmental Assistance to Neighborhoods (CLEAN) Program and Investigating Site Contamination (ISC) Program

The ISC and CLEAN Programs provide low-interest loans to conduct environmental site assessments (ISC) and cleanup (CLEAN) activities at brownfields or underutilized properties where “redevelopment is likely to have a beneficial impact on the property values, economic viability, and quality of life of a community” (DTSC Site Mitigation & Restoration Program, n.d.). The maximum ISC Program award is \$100,000 and the maximum CLEAN award is \$2.5 million. Eligible applicants include governmental entities, private businesses, individuals, and nonprofit organizations.

Targeted Site Investigation (TSI) Program

The Targeted Site Investigation (TSI) Program provides assessment, investigation, and cleanup planning services at no cost to selected participants. Grants do not go directly to the applicants. Instead, they go to a DTSC contractor who performs the work needed for the site remediation (DTSC TSI, 2020). Figures from the last program cycle indicate that grants ranged from \$30,000 to \$85,000. Eligible applicants include local or tribal governments, nonprofit organizations, and school districts. Applicants do not have to have ownership of the brownfield site, but they must have permission from the owner to gain access to it. Sites should be in the redevelopment planning process and meet the following criteria:

- Strong redevelopment potential
- Real or perceived contamination
- Clear need and municipal/community support for the property’s revitalization
- Redevelopment or reuse would benefit the community

This program is funded by a grant from the US EPA and is a stepping stone to applying for US EPA brownfield grants. These grants require a Letter of Acknowledgement from a state agency such as DTSC.

Unfortunately, the TSI Program has been suspended for the year 2020 due to uncertainty caused by the COVID-19 pandemic. DTSC is currently planning to innovate and transform the program into a new iteration called TSI+ Program. (DTSC TSI, 2020)

US EPA Brownfields Grants

The US EPA offers several grants for the assessment and cleanup of brownfields and related planning activities. EPA brownfields grants may be pursued by almost any legal entity, excluding for-profit organizations, individuals, and 501(c)(4) non-profit organizations that engage in lobbying (US EPA Brownfields Grants, 2020). Applicants for all grant programs must not be liable for any contamination of the site. The EPA distinguishes between sites contaminated with hazardous waste and sites contaminated with petroleum. For hazardous waste contaminated sites, or mostly hazardous waste co-mingled with some petroleum, the applicant must prove they are not liable under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund (EPA, 2018).

Petroleum contaminated sites are eligible for funding if they meet these requirements:

- There is no financially viable responsible party

- The applicant is not potentially liable for cleaning up the site
- The site is not subject to a corrective action order under the Resource Conservation and Recovery Act (RCRA) Section 9003(h)

The state usually determines petroleum-site eligibility, but if they cannot, the US EPA will make that determination. It appears that the Culver City portion of the IOF has a viable responsible party and would not be eligible for brownfields grants, since the US EPA generally considers ongoing businesses or companies such as Sentinel Peak Resources to match this description.

Types of US EPA Brownfields Grants (US EPA Brownfields Grants, 2020)

- **Assessment Grants:** Provide funding for brownfield inventories, planning, environmental assessments, and community outreach.
 - \$20,000 to \$600,000 for one or more brownfield sites.
 - Performance period: three years.
- **Cleanup Grants:** Provide funding to carry out cleanup activities at brownfield sites owned by the applicant.
 - Up to \$500,000 for one or more brownfield sites.
 - Performance period: three years,
 - Requires 20% cost-sharing.
(Culver City is eligible for a hardship waiver available for government entities with populations of 50,000 or less)
 - **Applicant must own the site at the time of application.**
- **Multipurpose (MP) Grants:** Provide funding to conduct a range of eligible assessment and cleanup activities at one or more brownfield sites in a target area.
 - Up to \$800,000 for one or more brownfield sites in a target area.
 - Performance period: five years.
 - Requires 40% cost-sharing.
 - **Applicant must own the site at the time of application.**

Amortization Study

On May 29, 2020, Baker & O'Brien released the report "Capital Investment Amortization Study for the City of Culver City Portion of the Inglewood Oil Field" finding that Sentinel Peak Resources will have received a return on investment within four years. Using a standard financial analysis, the study uncovers the time required for amortization of capital investment (ACI) — in which the cumulative income from an investment is enough to offset the initial capital investment and result in a return on that investment. The study methodology includes an Income Model, which uses Internal Rate of Return and Net Present Value to help determine when the ACI would occur.

Two scenarios were evaluated. The first is based on the presumed capital acquisition of the City IOF by Sentinel Peak Resources in 2017. Since the acquisition price does not directly account for the Culver City portion of the IOF, a fair market value of \$4.65 million was estimated.¹ This income model determined that the ACI would be reached within four years of acquisition by Sentinel Peaks Resources - in other words, they will have made their money back during 2020 (Cheek, Flessner & Kemp, 2020). The second scenario looks at the ACI for costs by other operators to drill and complete wells in the IOF since 1977. Though there is variability among

¹ Given that the Culver City portion is approximately 10% of the Inglewood Oil Field, the entirety of which was acquired for \$742 million (cash equivalent price) by Sentinel Peak Resources from Freeport-McMoran.

wells, this analysis finds that ACI for individual wells usually occurs within a few years. This is the case when individual wells are aggregated, since high returns from better performing wells tends to offset poor returns from marginal wells. This further supports the conclusion that Sentinel Peak Resources will receive ACI within four years (Cheek, Flessner & Kemp, 2020). Figure 13 shows the model assumptions and results for ACI using these base assumptions.

A sensitivity analysis reveals modest sensitivity to changes in acquisition cost but less so to changes in crude oil quality discount or the industry return on capital. In an analysis where the Sentinel Peak Resources acquisition price was replaced with \$5.34 million, ACI takes five years and occurs during 2021 (Cheek, Flessner & Kemp, 2020). Even if we take this more conservative estimate, it seems Culver City can begin proceedings to decide if they would like to retract the existing Conditional Use Permit and decommission the Inglewood Oil Field.

As noted in the report, Sentinel Peak Resources issued the “2020 Plan” to the Baldwin Hills CSD back in November 2019. The 2020 Plan is only applicable for the County IOF and no drilling plans were issued for the city IOF. However, it stated that Sentinel Peaks Resources was unlikely to drill any new wells in the County IOF during 2020, though it proposed drilling 9 new wells, redrilling 1 well, and to plug and abandon 12 wells (Cheek, Flessner & Kemp, 2020). While their intentions for the City IOF are unclear, Culver City must consider the implications of continued oil operations or even new drilling on the County IOF and how that may continue to impact health and environmental conditions.

Figure 13. Culver City Base Case Assumptions and ACI Tests

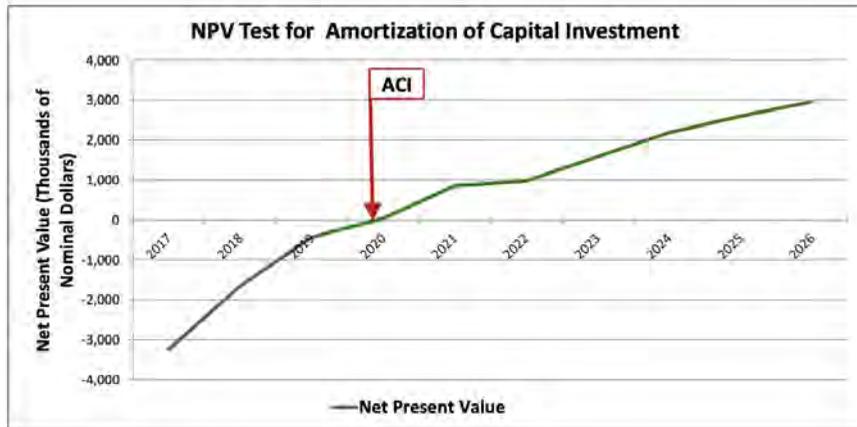
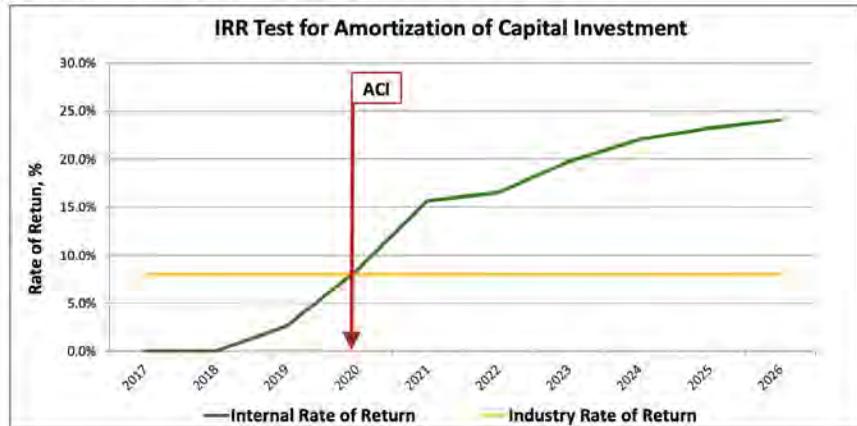
Model Assumptions

Industry Return on Investment	8.00%
Investment Year	2016
Initial Capital Investment, \$M	4,650
Price Adjustments: 2018 Dollars/Bbl	
Crude Oil Transportation - Inglewood to LB	0.25
Crude Oil Quality Differential	(1.75)
Natural Gas Quality Differential	0.00
Btu Equivalent: 5.8 MMBtu per BOE	0.172
Royalties	
Royalty Percentage	15.00%
Operating Costs: 2018\$/Bbl	
Oil & Gas Wells	8.00
Produced Water	0.25
Capital Expenditures: 2018\$M	
Workover Interval (Years)	7
Workover Cost per Event	180
Drilling and Completion Cost per Well	2,500
Plug & Abandonment Cost per Well	375

Model Results

Years for Amortization of Capital Investment	4
Amortization of Capital Investment by	2020
Maximum IRR	24.05%
Period 2017-2026	
Total Revenues, \$M	37,547
Total OPEX, \$M	19,934
Total CAPEX, \$M	3,434
Total Taxes, \$M	3,017
Total Net Cash Flow, \$M	11,162
Cumulative IRR at 2026	24.05%

Tests for Amortization of Capital Investment



Source: Cheek, W.D., Flessner, D.L. & Kemp, C.G. (2020, May 29). Capital Investment Amortization Study for the City of Culver City Portion of the Inglewood Oil Field. <https://www.culvercity.org/home/showdocument?id=19134>

FINDINGS

The decommissioning of the Inglewood Oil Field is informed by various legislative, regulatory, and community considerations. This report incorporates information from similar projects completed in or near the Los Angeles area. We have synthesized these experiences to determine the best approach for meeting the objectives of Culver City. Further topographical research sheds light on the physical constraints of the land itself.

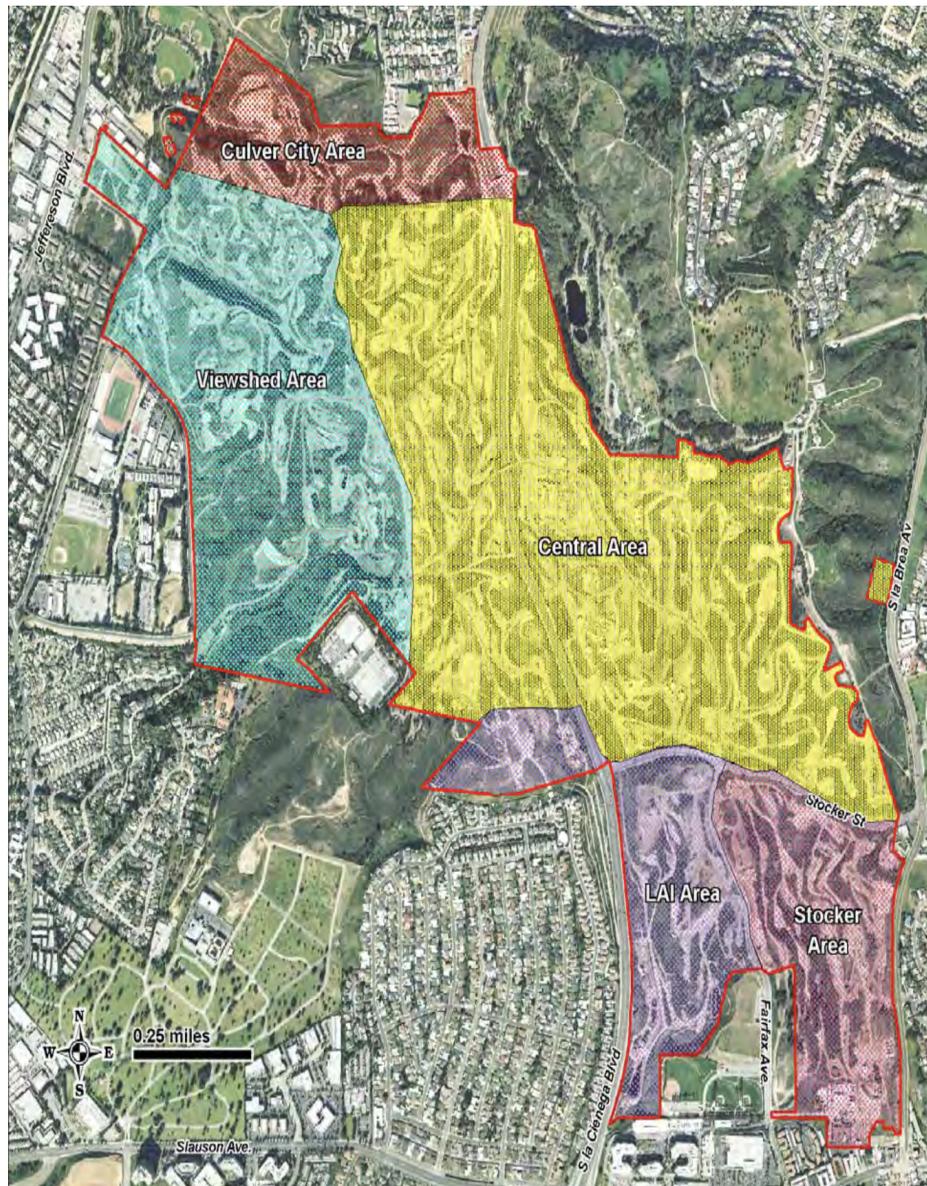
Our findings fit into the five categories: cross-jurisdictional cooperation with Los Angeles County, legislative capacity in terms of ownership and regulation, remediation liability of the city and the oil operator, as well as site specific constraints in terms of topography. These findings indicate the key considerations taken into account in directing our two main recommendations, which look at the site as it is and the potential for more intensive development .

Cross-Jurisdictional Cooperation

The amortization study commissioned by Culver City was only prepared for the City portion of the Inglewood Oil Field. This comprises 77.8 acres, an extensive piece of under-developed land in a rapidly growing city attracting the interest of brand name companies. Even so, this is less than 10 percent of the oil field, which totals almost 1,000 acres. Given that a majority of the Inglewood Oil Field falls under the jurisdiction of unincorporated Los Angeles County, it is worth considering whether Culver City could form a partnership to develop this land as a whole.

There are several benefits to developing the Inglewood Oil Field in its entirety. A primary reason is that the oil field is not split evenly. Figure 14 shows Inglewood Oil Field drilling areas, separated by Culver City and the remaining unincorporated areas. As indicated, even if Culver City decommissioned and redeveloped their portion of the oil field, it would not address the section overseen by the unincorporated LA County that directly abuts Culver City boundaries. As a result, the health concerns posed by Culver City residents would remain largely unaddressed. Air pollution is greatly impacted by wind direction and speeds, whereas the continued subsurface drilling activities could cause future seismic problems. Additionally, forming a partnership with LA County to involve the entire field could increase the availability of brownfields funding options.

Figure 14. Inglewood Oil Field Drilling Areas



Source: Baldwin Hills Community Standards District. (Oct. 2008). Final Environmental Impact Report. Prepared for LA County Department of Regional Planning.

Legislative Capacity

A review of existing literature suggested that the primary indicators for brownfield redevelopment, as listed below, provide 'regulatory standardization' that reduces the transactional costs of brownfield redevelopment (Barcot & O'Dell, 2006). In other words, the state legislative and regulatory entities can lessen the uncertainty for private developers while providing consistency across time and space to ensure an active and sustainable project.

Regulatory relief:

- Property mitigation costs
- Monitoring costs
- Deed restrictions and covenants and institutional controls
- Changing mitigation controls and improved detection technologies

The portion of the Inglewood Oil Field located within Culver City is owned by a patchwork of trustees and owners. These parties own assorted surface and subsurface property rights that are leased to the current operator, Sentinel Peak Resources, who holds the oil and gas drilling rights to the Inglewood Oil Field after purchasing them from Freeport-McMoran in 2017. The mineral rights owners receive royalties from Sentinel Peak Resources for the drilling activity conducted on their property. It is important to note that identifying the owners of subsurface mineral rights owners is difficult to fully ascertain due to the nature of severed ownership titles and deeds that split ownership of surface and subsurface rights. In many cases, ownership has changed hands or been transferred to trusts over the course of generations and requires additional resources for thorough investigation. Table 6 below details the current owners of the City IOF surface land parcels and the total assessed property value (as of 2019 LA County Assessor’s Office records).

Table 6. Culver City IOF Land Ownership, LA County Assessed Values (2019)

Surface Property Owner	Total Assessed Property Value (2019)	Property Tax Liability (2019)
Airey, Mary K. 2019 Trust (Revocable Trust)	\$75,954	\$5,310.92
JF McAllister LLC La Ballona LLC	\$92,377	\$7,715.70
Baldwin Hills Regional Conservation Authority	\$237,326	\$0.00
Pacini, Susan	\$27,535,426	\$185,716.23
Chevron USA Inc.	\$2,077,367	\$23,719.69
Los Angeles (City)	\$42,925	\$815.82
Culver City	\$1,167,129	\$0.00

As shown, ownership of the Culver City portion of the IOF consists of a patchwork of regular fee, government-owned exempt, and government-owned non-exempt parcels. An expanded list of these property interests can be found in Appendix B. Although some surface property owners, such as the Airey Trust, appear to also own mineral rights that are yielding royalties (Culver City, 2020), a full list of subsurface mineral rights owners is not available without further investigative resources. It is also worth noting that mineral rights owners in Culver City may also hold interests in other parts of the Inglewood Oil Field that lie in unincorporated County land.

Governor Newsom and state legislators are interested in strengthening regulatory agencies such as CalGEM, which provide statewide guidance on abandonment, site mitigation, and remediation. The effects of the COVID-19 pandemic on the state’s ability to continue their regulatory efforts remains to be seen. However, Los Angeles County and Culver City are empowered to provide other avenues of mitigating property costs through their oversight of remediation procedures and role as facilitators of surface ownership negotiations.

Remediation Liability

In a decommissioning and redevelopment scenario, the responsibility of remediating land for a future use will be determined by the level of ownership. Oil operators are often required to remediate the environmentally contaminated land that they own during sale negotiations.

However, some cities have encountered difficulty in pursuing required cleanup of former oil drilling sites. The City of Beverly Hills entered into an agreement in May 2019 with the Beverly Hills School District to jointly split the costs of plugging 19 oil wells at the Beverly Hills High School campus (Harold, 2019). The former oil and gas lessee for the wells was Venoco, a now defunct oil and gas drilling company, that also owned the offshore drilling Platform Holly site off the coast of the City of Goleta among many other assets in the state of California (Platform Holly, 2020). The company declared bankruptcy shortly after an oil spill off Refugio State Beach in Santa Barbara County in 2016 (Ventura County Star, 2016). The United States Bankruptcy Court for the District of Delaware allowed the company to leave the wells without decommissioning the site in accordance with state and local law, thereby leaving the costs of plugging the wells with the school district and city. Likelihood of the company declaring bankruptcy due to high remediation costs could result in the responsibility falling to the property owners or the local jurisdiction, as was the case with the City of Beverly Hills.

The Polanco Act, a state law enacted in 1990, assisted local redevelopment agencies by detailing processes to remediate brownfield properties in their jurisdictions. Most importantly, the law provides immunity from liability for redevelopment agencies and subsequent property purchasers for sites cleaned up under a DTSC-approved remediation plan (DTSC Fact Sheet, 2007). Under the law, a developer can enter into an Environmental Oversight Agreement that identifies a lead local agency such as CUPA or a Water Quality Board and DTSC as oversight partners over the course of redevelopment. Subsequently, DTSC is not compromised in its authority overseeing site characterization and cleanup consistent with the requirements set forth in Chapter 6.8 of the California Health and Safety Code (DTSC Fact Sheet, 2007).

The Santa Fe Springs case study presents a possible blueprint for an environmental remediation course of action for Culver City. In the former, the Santa Fe bought the pertinent land parcels after many years of community opposition to code violations on the oil and gas drilling sites. The city then hired an environmental consulting firm to prepare an environmental assessment and recommended course of action for remedial work. When Santa Fe turned over the site to private developers, the city was not responsible for conducting the extensive remediation.

Property records indicate a substantial remediation liability for any future redevelopers of the Culver City IOF. In 2019, the County reported the total assessed land value of the Culver City IOF to be \$31,228,504 for ten parcels. The subsurface mineral and well rights are owned by Sentinel Peak Resources and a smaller number of surface land owners without severed deeds.

Strong Community Sentiments

Culver City residents actively attend Baldwin Hills CSD Board Meetings, Culver City Council Meetings, in addition to the new CARB SNAPS program meetings to voice their concerns on pollution and health. Given the strong opposition towards the continued oil production in close proximity to residential areas, including grassroots organization efforts from both the Sierra Club and STAND-LA, it is clear that the oil field is an eyesore. In fact, the amount of time and effort

already put into campaigning for decommissioning will make it easier for Culver City to gather public support on this matter.

Much of the outrage has been based on health concerns, particularly cancer clusters in certain Culver City neighborhoods. Furthermore, community feedback at the SNAPS program input meetings was in favor of creating a resource that would allow residents to track air pollution levels in the immediate vicinity of the oil field. While this study intends to study the types of pollutants found in the area and whether these levels exceed normal thresholds, this uncertainty and strong community stance poses a constraint on more sensitive land uses. In our interviews with local Culver City residents, we find that proposing future residential development is often turned down despite the need for more housing in the area.

Site Specific Constraints

The physical landscape of the Inglewood Oil Field is marked by slopes. A topography map in Figure 15 shows that the Culver City portion of the oil field has dense clusters of contours, indicating quick changes in elevation or height. This adds to the difficulty of developing this piece of land.

Due to the presence of many slopes, the elevation varies throughout the site. A flat piece of land is preferable for any development, whereas slopes pose further development challenges. While it is possible to build on slopes, there is a limit to how much can be cantilevered. A costlier option involves grading the land to flatten it – though this may even out with the cost of building on a slope if the cut and fill are even during landscaping. A larger issue is that the roads in the oil field are mainly light-duty. Vehicles are limited by slopes and safe turning radiuses, and constructing roads may require flattening the site. Adding on concerns of erosion, subsidence, liquefaction, landslides, and induced earthquakes, an assessment of the land is required to understand whether it is possible to sufficiently and safely develop on this land, and how much of a limitation this poses in terms of reduction in land use intensity (Psomas, 2017).

RECOMMENDATIONS

As evidenced by strong community sentiment and Culver City Council unanimously approving to commission an amortization study, leaving the Inglewood Oil Field to continue negatively impacting local quality of life is not an option. Culver City has initiated the crucial first steps to understanding the status of the oil field, suggesting that they are ready to make changes based on the findings of the study. The study determined that the Sentinel Peak Resources will reach amortization of capital investments during 2021, if they have not already. Even so, there are other considerations Culver City must take into account when deciding how to move forward, such as the cost of remediation and opposition from subsurface rights owners.

We group our recommendations for Culver City into three sets: based on the site as is, beyond the constraints of the site, and in terms of the Culver City General Plan Update. Based on the site as is, we find the easiest and cheapest option would be to remediate the land to the lowest acceptable level and designating it land partially as green space and for solar farming. Culver City will benefit from added park resources for residents and a revenue generating energy source that does not conflict with their sustainability objectives. The second recommendation moves beyond the constraints of the site, which is currently limited by its topography. This proposal suggests looking towards urban retail and office space, given the industry-leader companies that are planning to move into Culver City within the next few years. Finally, in terms of the Culver City General Plan Update, we believe that intentionally enhancing the language to be strongly in favor of green initiatives and proactive against nonconforming uses will enable the city to achieve a forward-thinking vision. Given the scope of this issue, it would be beneficial to designate city resources into the hiring of staff that is exclusively dedicated to decommissioning the Inglewood Oil Field and further support sustainable development within Culver City. This would enable more consistent communication between Culver City and Los Angeles County regarding the oil field, and potentially push for a coordinated approach in decommissioning the entirety of the site.

RECOMMENDATION BASED ON EXISTING SITE CONSTRAINTS

Given that an environmental assessment has not been conducted, it is impossible to judge the current state of soil and groundwater. The Inglewood Oil Field has operated for over 100 years. While stricter regulations have been put in place during its existence, there lies the possibility of improperly abandoned wells – whether they are not documented by CalGEM or they were abandoned to prior standards that no longer meet current requirements. In terms of impacted soil, the preferred method is to reengineer and reuse on site. However, in certain cases

hazardous soil may need to be transported to a landfill. Other subsurface issues include groundwater and combustible gases.

These considerations, along with the current topography of the site, makes the remediation cost less straightforward. The many slopes located throughout the site also pose a transportation issue, since there are only soft roads on site and new developments will require infrastructure that can handle more intensive traffic. Whether engineers can design around these slopes, for roads and future developments, it can still amount to a massive cost overrun. Excavation is not a likely option due to the existence of oil wells on site, and there is a limit to how many buildings can be cantilevered.

With these considerations in mind, the most cost-friendly and least risky option is to remediate the land to the lowest level allowed for environmental use. Because green space is not considered a sensitive land use, the remediation requirements are less stringent. A minimally intrusive approach can reduce upfront remediation costs. In conjunction with the green space, part of the land can be set aside for solar panels. Solar farming, depending on the scale, may be a productive use of land as it generates revenue through providing much needed clean energy to city residents. In doing so, it addresses a sustainability objective already supported by Culver City through the Clean Power Alliance and Energy Upgrade California. This requires determining how suitable the site is for the placement, since solar panels in the Northern Hemisphere must face south to receive the most sunlight. With the unincorporated Los Angeles County portion of the Inglewood Oil Field directly to the south of the Culver City portion, the idea of placing solar panels may be limited based on the unremediated topography – or even plans to develop the County IOF in the future that can overshadow this use.

The placement of the Culver City Park and Baldwin Hills Scenic Outlook to the North of the site, in addition to the Kenneth Hahn State Recreation Park to the East, suggests that there is not a significant lack of green space in or near the area. As a result of this, it may be better to designate much of the land to solar panels if possible. However, the cost efficiency of implementing less sensitive uses will most likely be seen in the remediation costs. For this reason, we propose a dual-use of green space (whether in the form of a park or restored nature reserve) and solar panels to most productively utilize this site given these constraints.

RECOMMENDATION FOR ADDRESSING THE FULL POTENTIAL OF THE SITE

For development purposes, it would be easier to imagine the Inglewood Oil Field as a relatively flat piece of land. This is not realistic, and it may not be plausible or financially feasible in terms of engineering, however we have given this scenario consideration to provide insight on the types of development that may be economically beneficial. The location and growth trajectory of Culver City has attracted companies like Google, Apple, and HBO. This may push more companies to move or relocate to the area, producing a demand for office space and lifestyle amenities. Incorporating office space and urban retail into a portion of the remediated Inglewood Oil Field may provide a solution to this demand.

Much of the concern with decommissioning and remediation is determining who covers the cost and the potential of the land. The Recreation Element of the Culver City General Plan has deemed the Inglewood Oil Field a nonconforming use, and it continues to operate because it has been grandfathered in. In terms of the oil operator, it is difficult to assess whether they will be able to take on the financial responsibility of capping and abandoning wells. Ultimately, placing the cost of remediation and re-engineering slopes on developers will negate the viability of projects. Even if Culver City can find a way to subsidize the cost of remediation or land, the existing topography greatly reduces the possibility for even medium intensity development projects.

Ultimately, the ideal scenario is for Culver City and Los Angeles County to form a coordinated approach to decommissioning the entire Inglewood Oil Field. In doing so, it may increase the amount of funding and grants available given the sheer size of the whole site. Not to mention, only remediating the Culver City portion of the IOF will not prevent pollution from the County IOF from continuing to impact the health and safety of Culver City residents. While Los Angeles County does not seem to have any plans for decommissioning, it will not be a comprehensive solution if they are left out of the equation.

GENERAL PLAN UPDATE

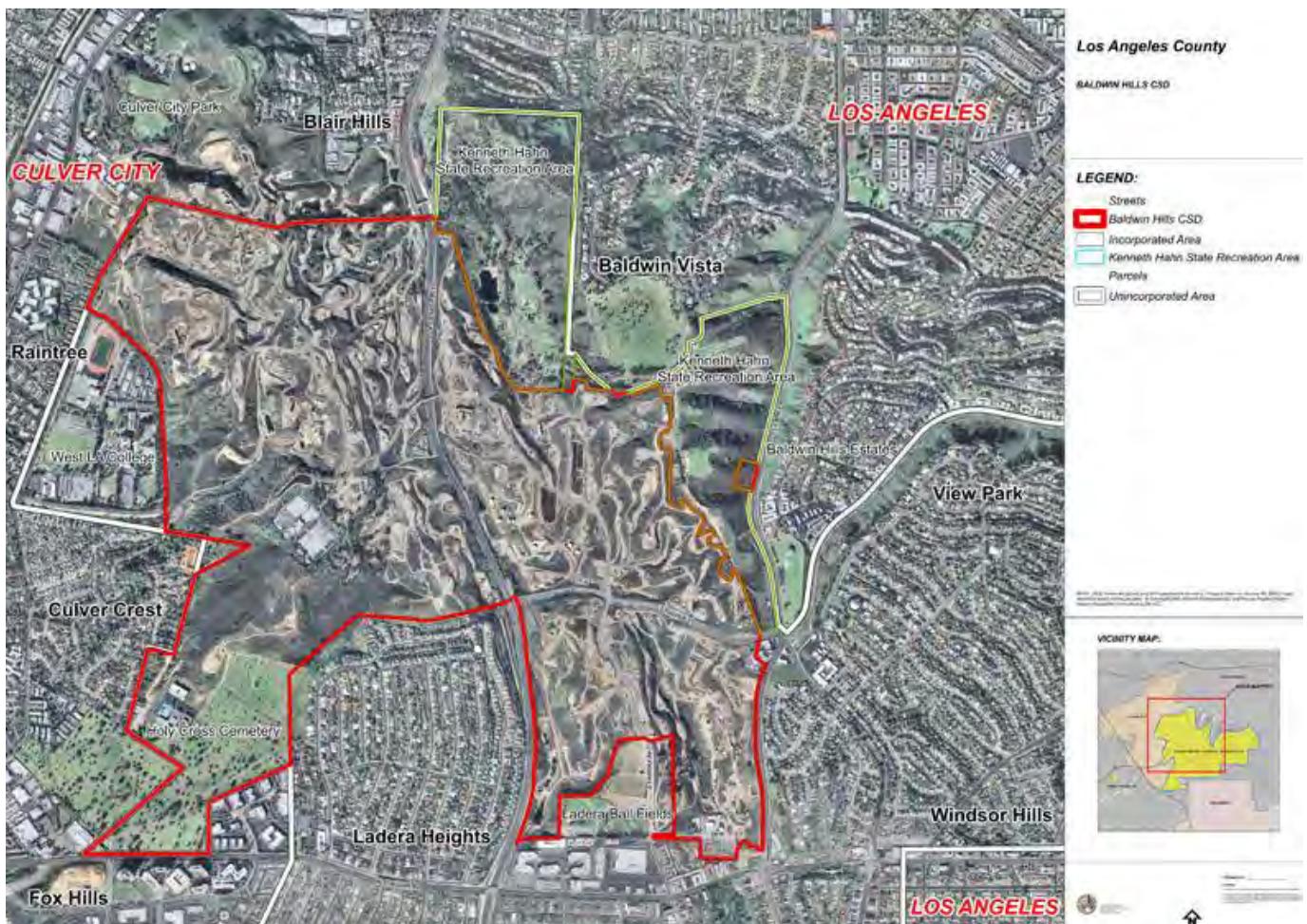
The Culver City General Plan of 1973 outlined the boundaries and land use designation for the Inglewood Oil Field under the Conservation and Recreation Elements. The Inglewood Oil Field is designated as a nonconforming land use that was envisioned into multiple repurposing scenarios to serve the expected population growth of Culver City. In the Recreation Element, the authors recommended the future conversion of the oil field into increased acreage for the Blair Hills neighborhood – in addition to the creation of an urban park designated as over 50 acres. The authors understood the limits of expansion within the field due to the shared boundaries with Los Angeles County, however, the General Plan made room for the possibility of annexation of those lands in the future. In the Conservation Element, the authors conclude that the supply of oil is not unlimited, and when this land use is no longer economical other uses can be explored.

The language of these sections made possible the amortization study that is now underway. The findings of this research has determined that Sentinel Peak Resources will reach a return in investment of oil facilities and operations during 2021. It may be important to note that the Baldwin Hills CSD allows for 500 wells to be drilled until 2028, though the oil operator has not filed for any permits to do so. To further support the effort of Culver City to become sustainable and forward-thinking, we think it is best to include dedicated staff as part of the Culver City General Plan Update. The most comprehensive and ambitious course of action would be for Culver City to actively enhance the prior language of the General Plan. The first component, the amortization study, has already determined that Sentinel Peak Resources is nearing the time needed for a return on investment. The second aspect of the previous General Plan includes considering the annexation of the County IOF, since there are limits

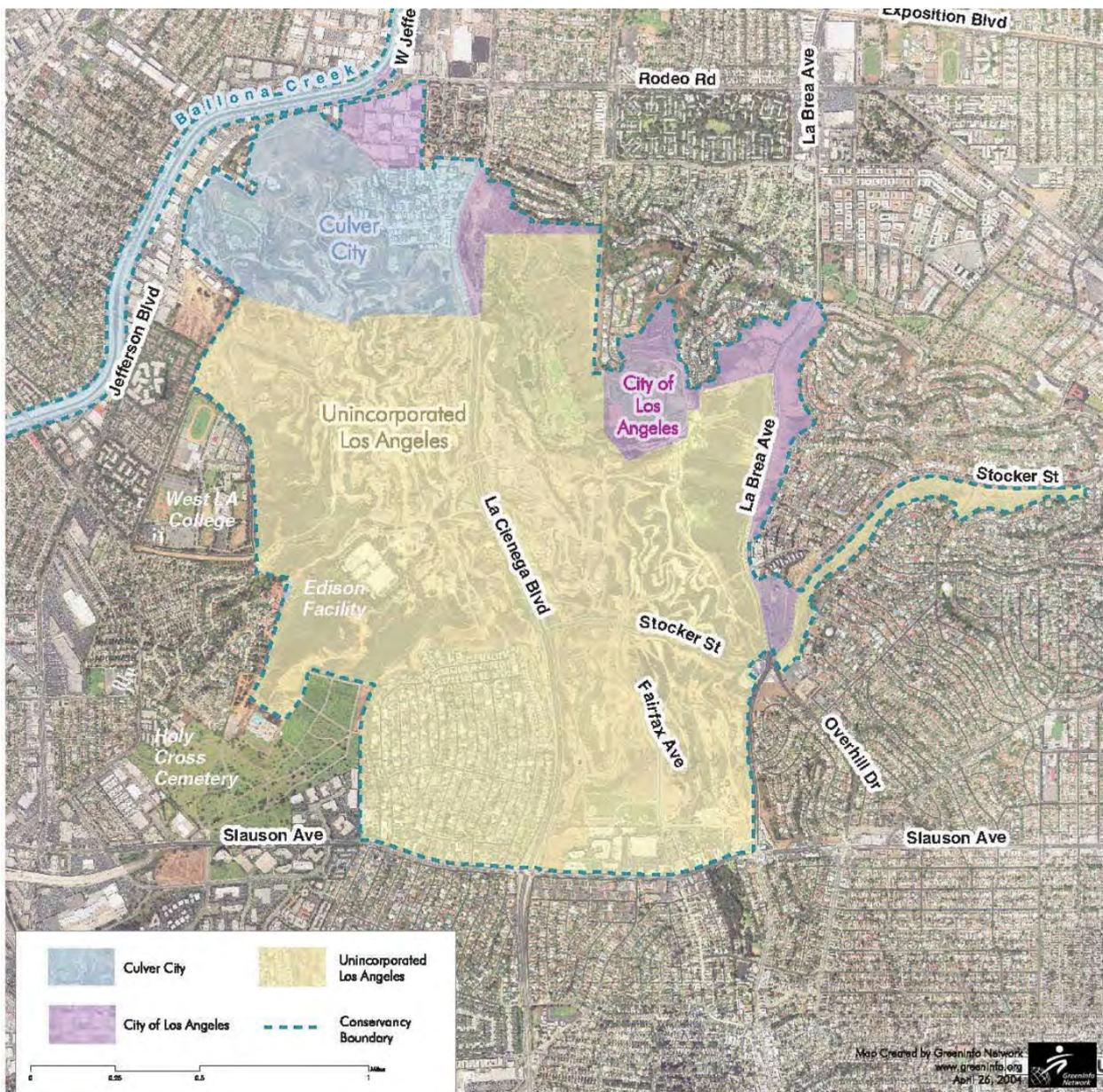
to expansion due to the shared boundaries with LA County. By actively including language in the General Plan that supports a forward-thinking vision, Culver City can set in stone their expectations for what the city should look like in the future and simultaneously empower the city to continue undertaking more sustainable and green initiatives.

Working towards a solution in conjunction with the County IOF would be the most comprehensive way to divest from fossil fuels and move towards green industry such as solar farming or improved open space. Despite the profitability of solar farming, it is uncertain whether the topography will allow for sufficient land area in the City IOF to exploit this resource. Culver City can take initiative to find and invest in a feasible solution, emerging as a leader in an effort to redevelop the largest urban oil field – and potentially act as an example for other urban oil fields in Los Angeles to follow suit. From our analysis, solar farming and green space are the most feasible solutions, since housing and other commercial uses are limited by site constraints. However, not all urban oil fields face the same limitations as the Inglewood Oil Field, and may be able to benefit from learning from the redevelopment of a site with many challenges.

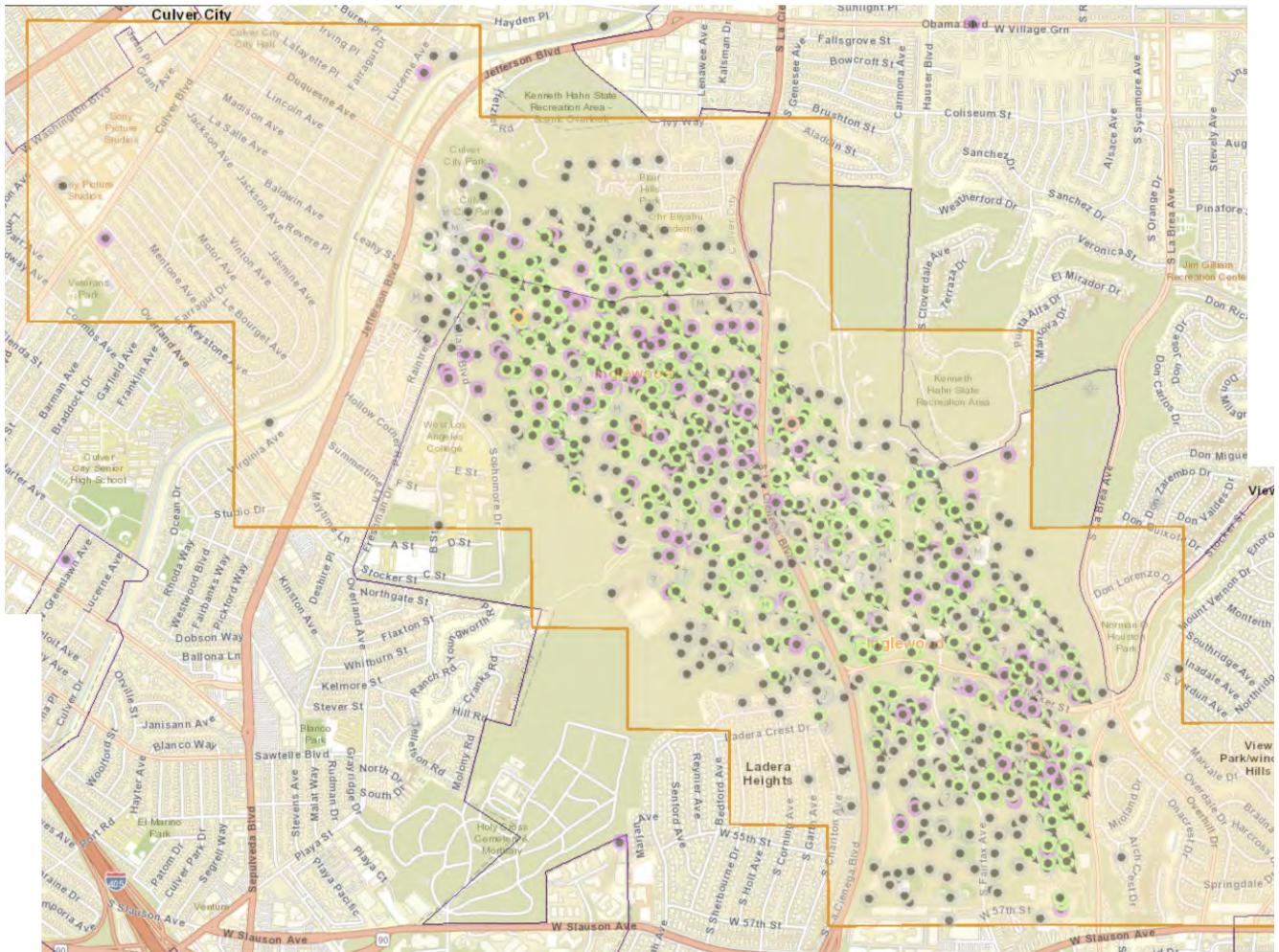
APPENDIX A



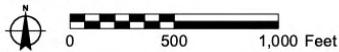
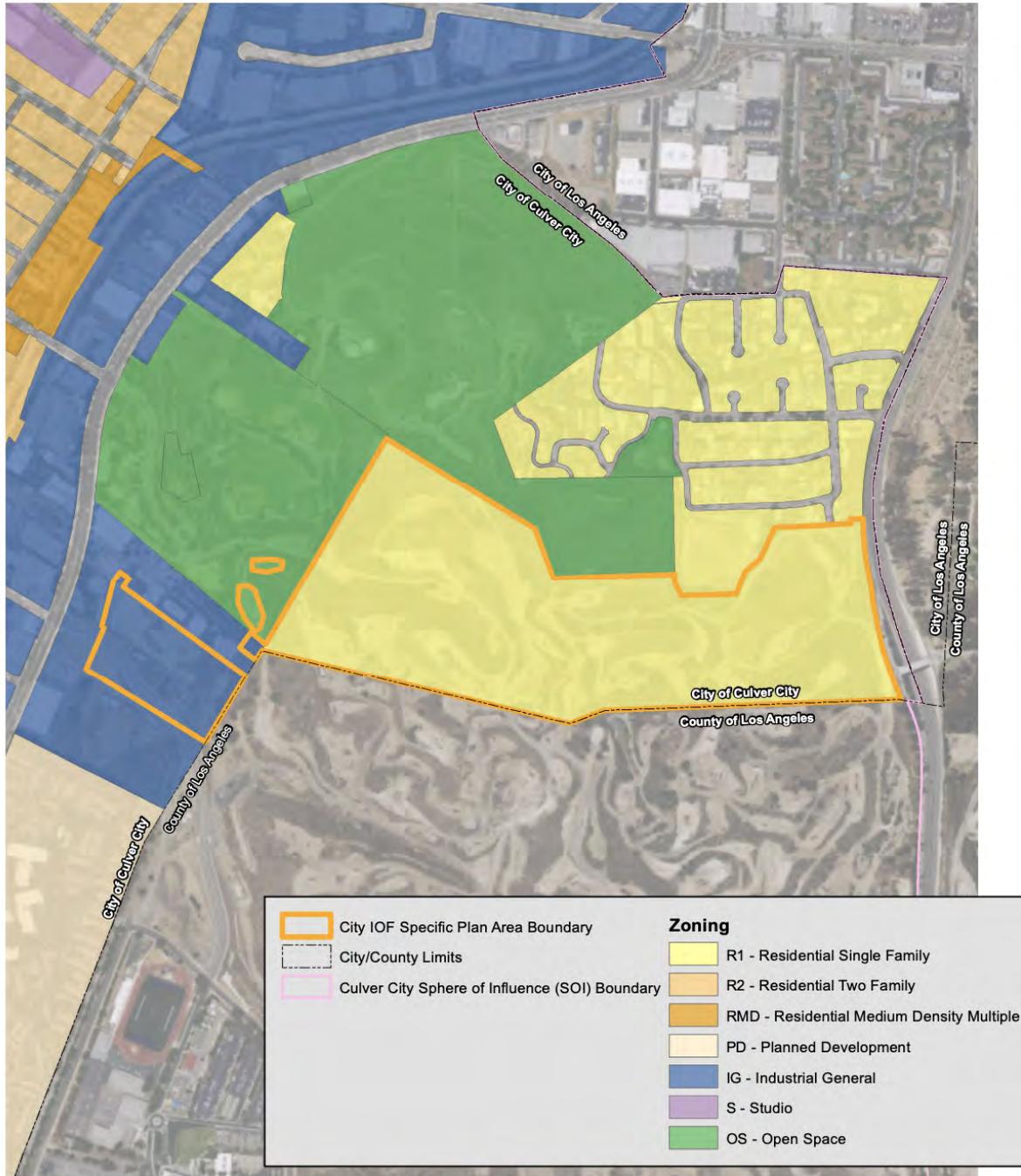
Boundaries of the Baldwin Hills Community Standards District, Unincorporated Los Angeles County. Courtesy of the County of Los Angeles Department of Regional Planning.



*Jurisdictional Boundaries of the Baldwin Hills Parklands.
 Courtesy of the Baldwin Hills Conservancy.*



Inglewood Oil Field, Active Surface and Subsurface Boundaries (in orange), with marked oil wells. Courtesy of CalGEM WellFinder Database, May 2020.



Zone Districts

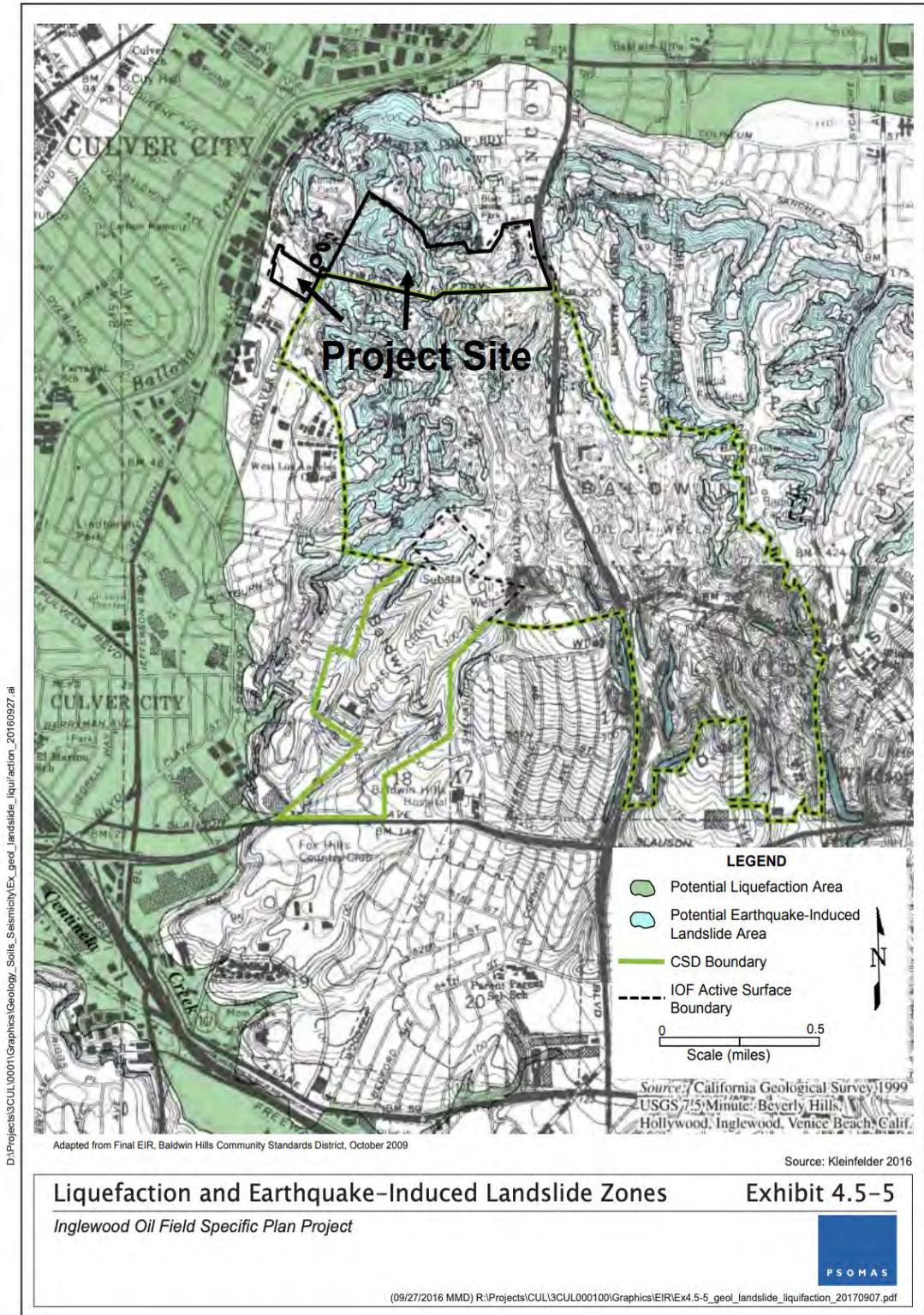
FIGURE

6

Inglewood Oil Field Specific Plan

Source(s): Google Earth Aerial (02-2016); City of Culver City (2016); Planning PLUS/P+ (2017).

Zone Districts for the Culver City portion of the Inglewood Oil Field. Courtesy of the City of Culver City, Inglewood Oil Field Specific Plan (2017).



Liquefaction and Earthquake-Induced Landslide Zones for the Inglewood Oil Field, Culver City portion highlighted in black. Courtesy of Psomas.

APPENDIX B



	AIN	Sale Date	Deed Type	Land Value	Tot. Sq Ft	Acres	Zoning	Owner Name	Parcel Type Tax Status
1	4204-014-015	09/27/19	Affidavit	\$75,954	788,625	18.11	CCR1AY	Airey Mary K 2019 Trust, Revocable Trust	Regular Fee Parcel
2	4204-017-006	09/15/15	Grant Deed	\$40,913	1,550,783	35.6	CCR1AY	JF MCallister LLC La Bal-lona LLC	Regular Fee Parcel
3	4204-014-013	09/15/15	Grant Deed	\$48,852	85,955	1.97	CCR1A	JF MCallister LLC La Bal-lona LLC	Regular Fee Parcel
4	4204-014-907	12/05/01	Grant Deed	\$217,326	442,505	10.16	CCR1AY	Baldwin Hills Regional Conservation Authority	Government Owned Exempt
5	4204-014-905	07/12/19	Correction Deed	\$10,389,226	43,868	4.13	CCM1YY	Pacini Susan	Government Owned, Exempt
6	4204-014-018	02/24/03	Grant Deed	\$2,077,367	51,232	1.18	CCR1AY	Chevron USA Inc	Regular Fee Parcel
7	4296-001-014	07/12/19	Correction Deed	\$17,136,000	181,736	4.17	CCM1YY	Pacini Susan	Regular Fee Parcel
8	4296-001-276	N/A	N/A	\$42,925	17,000	0.39	CCM1YY	LA City	Government Owned, Non-Exempt
9	4296-001-905	12/05/01	Grant Deed	\$0	179,737	1.01	CCR1AY	Baldwin Hills Regional Conservation Authority	Government Owned, Exempt
10	4204-003-901	1977	Deed (Reg)	\$0	1,631,222	86.88	CCOS	Culver City	Government Owned, Exempt

Culver City Inglewood Oil Field, Surface Land Property Owners and Assessed Values.

Compiled with 2019 Los Angeles County Assessor Records and CoreLogic.

GLOSSARY

Amortization - In the simplest terms, amortization calculates the point at which the value of investment equals the cumulative value of market return investment.

Brownfield Development - According to the EPA, “a brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.” In this case, suggestions for future development must take into consideration the specific legal, environmental, and health implications of redeveloping the oil fields.

Decommissioning - Refers to removing oil wells from service. This requires a deeper understanding of oil well types and nomenclature, since some wells may be categorized as idle or abandoned but are not plugged.

Mineral – Ores of metals, coal, oil, natural gas, gemstones, dimension stone (quarried natural rock shaped to a specific size), construction aggregate and evaporates, including salt, potash, gypsum.

Mineral Rights (a.k.a. Mineral Interests, Subsurface Rights) – Best conceptualized as a bundle of legal rights, duties, and obligations, including the rights to: make decisions affecting subsurface exploration, receive bonus payments, receive delay rentals, and receive royalty payments. Mineral rights can be owned individually, so the entity that owns the executive right may not necessarily own the associated mineral or royalty interest. U.S. laws regulating mining and mineral rights typically prohibit the mineral owner from damaging, or interfering with the use of any homes or other improvements on the land when extracting minerals. Rights typically include the right to use the surface of the land to access and mine the minerals owned.

Mineral Lease – A mineral lease creates a leasehold interest in subsurface minerals, meaning the lessee has the right to use and possess the commodities below the surface property for a designated period. Mineral rights leases are preferred over deeds that convey ownership outright because they are efficient and flexible. Mineral lease agreements are typically drafted to be highly specific, conveying information about the parties involved, the term of the lease, a legal description of the land and any specific provisions that may be appropriate.

Executive Right – The right to make decisions with regards to exploration, it allows the creation of an economically valuable mineral estate. Executive right gives a developer the opportunity to know what valuable petroleum and mineral commodities are stored underground.

Naked Right – An industry term describing an extraction company that owns an executive right but none of the associated mineral or royalty interests. This can be a valuable option when it's unclear whether valuable subsurface commodities can be found in the area at all.

Bonus Payments – Payments made on mineral leases. Common benefits that landowners receive in exchange for conveying their subsurface rights to oil, gas, and mineral developers.

Land Bonus (a.k.a Leasing Bonus) – An agreed price between the mineral owners and an operator for a set number of years prior to drilling/digging. The land bonus is like rent, usually paid annually with a set value per acre. A land bonus is a means of holding the lease until the operator has time to line up contractors to drill or dig.

Delay Payments – Payments made by mineral holders to maintain the right to the minerals without developing the underground resources. Even if a developer doesn't actually extract anything from the subsurface estate, landowners are entitled to payments for delay. If a well or mine is productive, mineral interest holders must pay a share of production to the lessor as a production payment.

Royalty Interests – Created by deed, an amount paid based on extracted material but does not come with any rights to participate in the execution of oil, gas and mineral activities. Continues to be enforceable regardless of whether the owner of the mineral interest makes money by extracting commodities from the land. Does not give the property owner rights to any share of ordinary cash, delay rentals or bonuses to which the mineral holder may be entitled. Does not include the right to use the surface estate or create any right or obligation to share in profits or costs.

Royalty – Percentage of the revenue from the sale of the product. The royalty percentage is usually negotiated in a lease. In some states, there is a minimum royalty given to the owner of the mineral rights.

Deed – A written instrument that conveys ownership right from one owner to another. In mineral rights, deeds convey everlasting mineral or royalty interests. Establishes an ownership interest that does not lapse or expire.

Fee Ownership – Under this arrangement, a single owner is entitled to the entire

estate including the surface lands, the subsurface minerals, and all the legal and economic interests involved.

Horizontal Divisions – Meaning that different entities may hold independent interests in minerals located at different depths.

Grantor – In a deed, identifies the owner who must be competent to carry out property transfer.

Grantee – In a deed, the property purchaser.

Property Conveyance – Deed terminology central to determining the rights and duties. Minor differences in the language of conveyance in a deed can have a substantial impact on legal rights and responsibilities, such as when an estate is broken up and sold as individual rights and interests.

Severance Deeds – Transferring mineral rights at different depth intervals, which include all interests for the subject property from the surface of the property to a specified depth, or from one depth to another. For example, a severance deed may convey one mineral interest “from the surface of the land to a depth of 12,000 feet,” to a party and a separate mineral interest “from a depth of 12,001 feet to a depth of 15,000 feet” to another entity.

Dormant Mineral Statutes – These laws often provide that a mineral estate reverts to the owner of the surface property if it is not utilized for its minerals for a specified period of time.

Surface rights – Ownership of the land for purposes such as agriculture, housing and commercial buildings.

Working Interest Owner – Pays an agreed percentage to drill and complete the well in addition to maintenance to keep the production flowing. Their percentage of production revenue is after expenses.

Unified Estate – When the same owner holds both surface and mineral rights.

Split Estate – When surface and mineral rights are severed from each other.

Fractional Estate – When mineral rights are split between several owners. This may happen, for example, when a property owner divides rights among several heirs or sells some mineral rights but retains others.

Oil and Gas Rights – The lessee is usually uncertain if oil or gas will be found, so they generally prefer to pay a small amount for a lease rather than pay a larger amount to purchase. A lease gives the lessee a right to test the property by drilling and other methods. If drilling discovers oil or gas of marketable quantity and quality, it may be produced directly from the exploratory well.

Well Abandonment - Oil well abandonment occurs when a well reaches the end of its useful life and no longer produces any oil. There are specific procedures for plugging or abandoning wells, due to the hazardous nature and risks involved. The term can also refer to companies who have not made efforts to properly decommission the wells.

Waiting On Pipeline Clause – Industry term that extends the lessee’s rights for a limited or indefinite period of time when the oil and gas lessee discovers oil or gas but has no way to transport it to market.

Unitization – Procedure where the proposed sharing of royalties will be based upon what is known about the geometry of the oil or gas reservoir compared to the geometry of property ownership at the surface. Occurs in states that require drilling companies to specify how oil and gas royalties will be shared among adjacent property owners when a permit for drilling is filed, recognizing the ability of oil and gas to cross property boundaries underground.



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