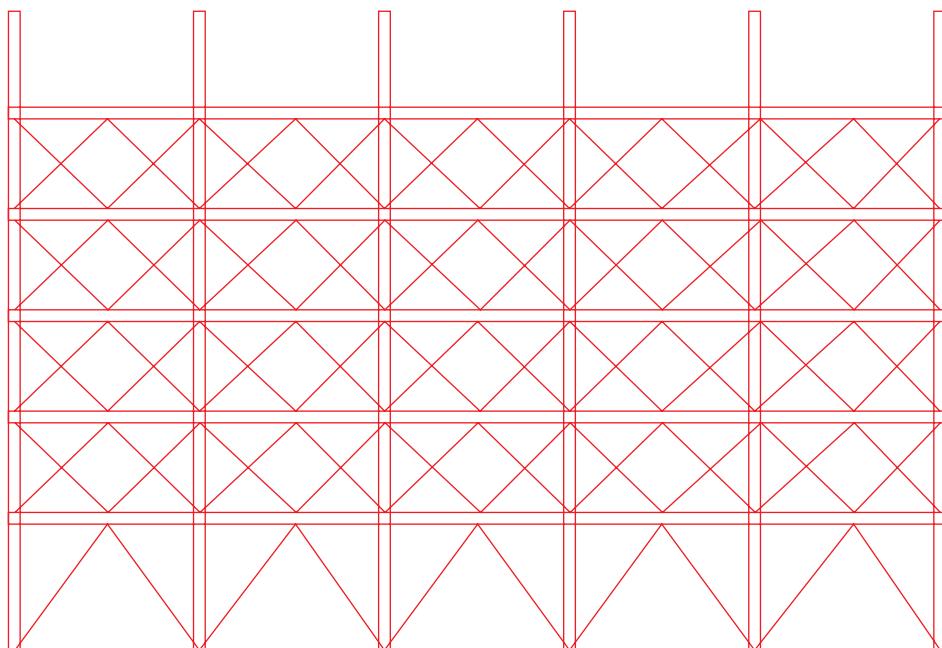
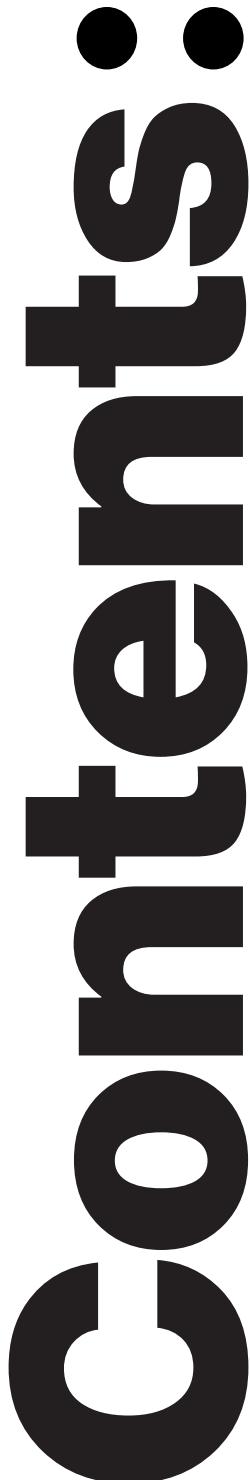


The **Pigeon** Problem

City of Berkeley Pigeon
Deterrence Strategy





STRUCTURELOGY

Introduction

01 Why Pigeons Love Us

Situation At Hand

03 Garage under Seige

06 Framework for Change

Past Deterrence Stratagies

09 Spikes

11 Electric Shock System

13 Sticky Solution

15 Nylon Netting

Why They Didn't (Or Did) Work

17 What Worked

20 What Didn't

Our Proposed Solutions

23 More Spikes!

25 Upgraded Nets

27 Ultrasonic Deterrent

39 The Total Package

Whats It Cost to Save a Garage?

31 Budget Breakdown

32 Projected Savings

How We Shared Our Findings

33 City of Berkeley Pigeon Deterrence Strategy:
Review and Recommendations

A Look Ahead: A Pigeon Free Future

41 Summary and Conclusion

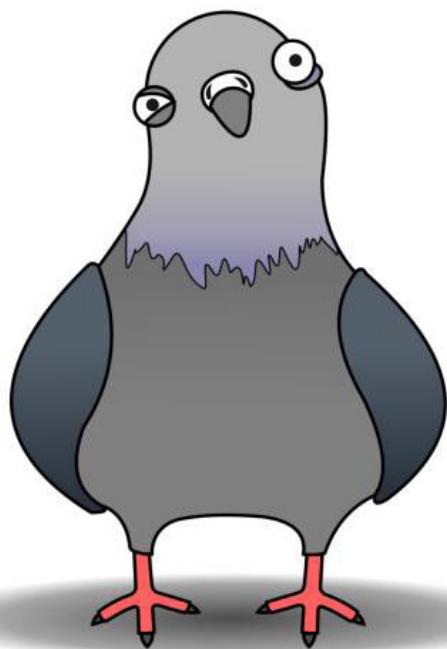
Why Pigeons Love Us

A little bit of Context...

Pigeons are a pervasive presence in urban environments, and their prevalence is not coincidental. Cities like Berkeley provide the perfect conditions for pigeons to thrive: ample food sources, abundant shelter, and a lack of natural predators. Urban architecture mimics the cliffs and rocky outcroppings pigeons originally inhabited, with building ledges, beams, and rooftops serving as ideal roosting and nesting sites. The compact layout and density of urban areas ensure pigeons have constant access to resources and protection, making cities an optimal environment for their survival.

In Berkeley, areas like the Telegraph-Channing Garage exemplify the challenges posed by urban pigeon populations. The abundance of restaurants and food vendors in the area inadvertently supplies pigeons with a consistent and easily accessible food source, encouraging their continued presence. Pigeons are opportunistic feeders, and even minimal food waste—whether from garbage bins, crumbs, or discarded meals—sustains their populations. Additionally, the structural design of parking garages, with their sheltered ledges and open frameworks, provides an ideal habitat, offering protection from the elements and human activity.

The lack of natural predators in urban areas like Berkeley further exacerbates the issue, as pigeons are free to nest and reproduce without significant threat. This results in rapidly growing populations, leading to extensive maintenance costs for property owners and municipalities, as seen in the ongoing cleaning and repairs required at the Telegraph-Channing Garage. Understanding the ecological and architectural factors that contribute to pigeon behavior is critical to developing effective mitigation strategies.



Rooftop Real Estate

Originally rock-dwelling birds, pigeons have effortlessly transitioned to city life, swapping cliffs and crags for ledges, beams, and rooftops. Our buildings mimic the natural habitats they evolved in, offering plenty of perches for resting and nesting.



What City Pigeons Talk About

Art by rosemarymosco



A Never-Ending Buffet

Ever wonder why pigeons are such a common sight in urban areas? It's no accident—they've found their perfect habitat in our cities. With plenty of food, shelter, and safety, pigeons thrive in the environments we unknowingly designed for them. From the smallest alleyway to the tallest skyscraper, the modern city is their playground.

Garage Under Seige



Garage Under Seige

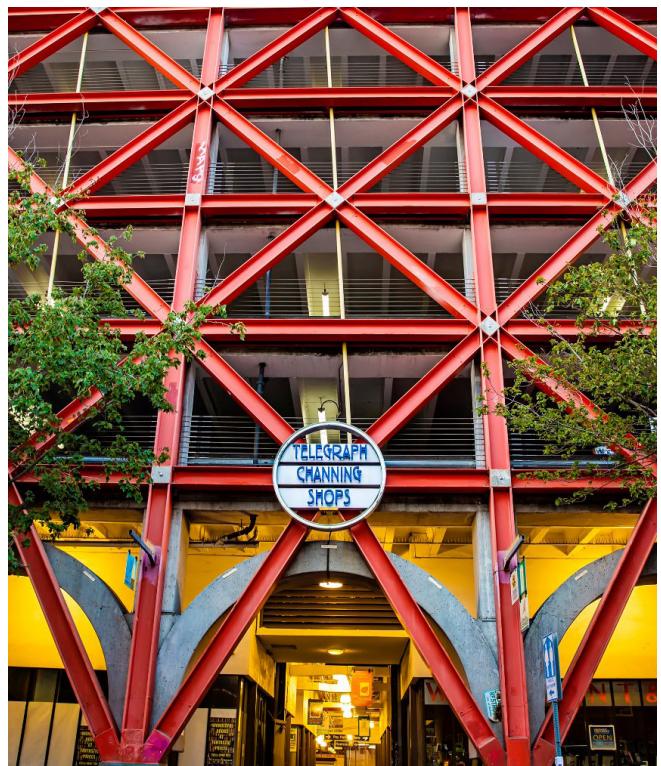
Introduction to the Issue

The Telegraph-Channing Garage in Berkeley has become a prime example of the challenges posed by urban pigeon populations. Despite various efforts to deter them, pigeons have made the structure their home, causing persistent maintenance and sanitation issues. The design of the garage, with its open framework and numerous ledges, unintentionally provides pigeons with an ideal habitat. These sheltered spaces offer protection from predators, weather, and human activity, making the garage an attractive nesting and roosting site. The proximity of restaurants and food vendors further exacerbates the issue, ensuring a constant food supply that encourages pigeons to remain in the area.

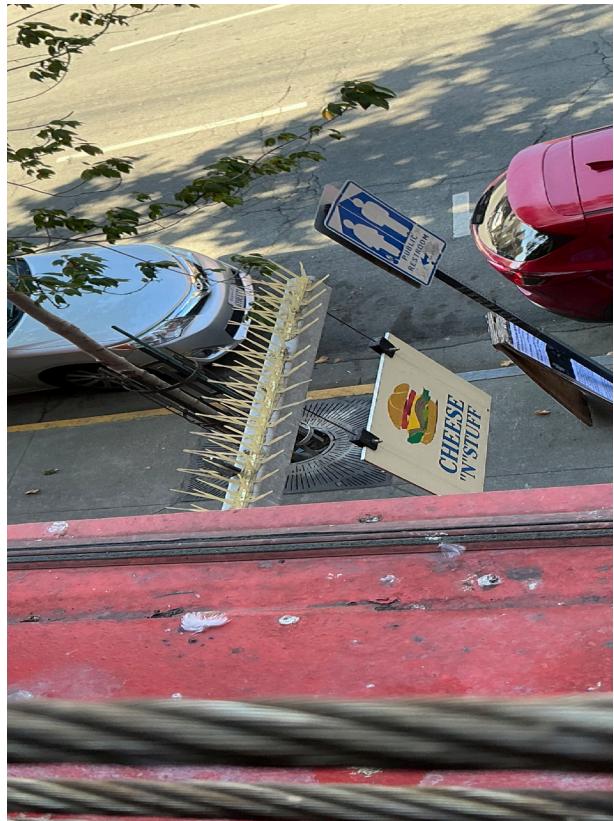
The impact of this infestation is both aesthetic and financial. Bird droppings accumulate on surfaces, creating unsightly stains and unsanitary conditions for both pedestrians and vehicles. The acidic nature of pigeon droppings can corrode metal, damage paint, and degrade building materials over time, leading to costly repairs. Currently, the City of Berkeley spends an estimated \$20,000 annually on cleaning and maintenance for this single structure. These repeated expenditures highlight the inadequacy of previous mitigation strategies, such as sporadic installations of spikes, sticky deterrents, and nylon netting, many of which have been inconsistently

maintained or improperly deployed.

The scale of the problem at the Telegraph-Channing Garage underscores the need for more effective and sustainable solutions. Without addressing the root causes of the infestation—namely, the structural conditions that enable roosting and the availability of food in the surrounding area—the cycle of damage and costly cleaning will continue. This case serves as a microcosm of broader urban challenges related to pigeons and highlights the importance of designing deterrent strategies that are both humane and long-lasting.



Garage Under Seige





Frameworks for Change

How to Approach

The ongoing pigeon infestation at the Telegraph-Channing Garage illustrates the intersection of urban design, wildlife behavior, and human activity. While the challenges are clear—significant maintenance costs, structural damage, and sanitation concerns—so too are the opportunities for improvement. To effectively address the issue, it's essential to move beyond piecemeal fixes and toward a comprehensive strategy that tackles the root causes of the problem.

This requires rethinking the relationship between urban infrastructure and wildlife. Pigeons are not inherently the issue; they are responding to an environment that unintentionally supports their needs. Open structural designs, plentiful food sources, and a lack of predators create the perfect conditions for their proliferation. Any solution must balance the needs of the community with the realities of urban ecosystems, ensuring that interventions are humane, sustainable, and effective.



In this report, we outline a new approach to pigeon management at the Telegraph-Channing Garage, drawing on proven methods and innovative designs. By integrating practical deterrents, durable materials, and strategic maintenance, we aim to present a plan that not only reduces the impact of pigeons but also sets a precedent for addressing similar challenges across urban environments. This is not just about mitigating a single problem but about reimagining how cities can coexist with the wildlife they inevitably attract.

Previous Deterrent Methods

What They Have Already Tried

Over the years, various deterrent methods have been implemented at the Telegraph-Channing Garage to address the persistent pigeon problem. While each method had its merits, the lack of consistent application and maintenance has limited their overall effectiveness. These approaches serve as a critical foundation for understanding what has worked, what hasn't, and why new strategies are needed.

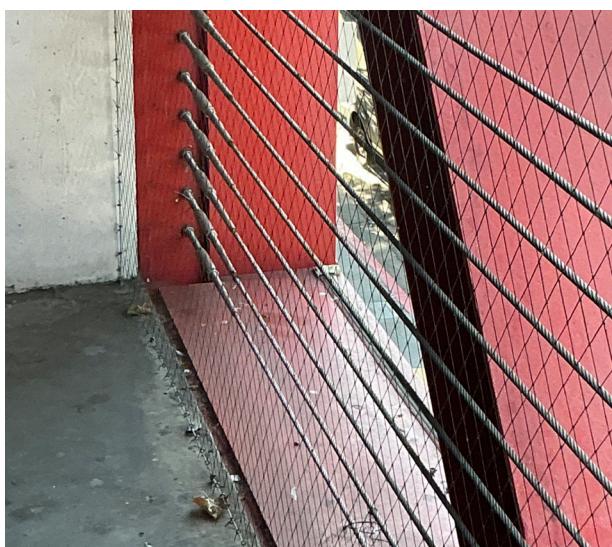
Bird spikes were installed along interior edges and ledges to prevent pigeons from roosting. This method proved highly effective in areas where spikes were properly deployed, achieving a success rate of 90%. However, gaps in coverage and improper reinstallation after maintenance created openings that pigeons quickly exploited. Despite their effectiveness, spikes require careful planning and consistent oversight to maximize their impact.

Nylon netting was installed across specific sections of the garage, primarily to block pigeons from accessing interior areas. While the netting showed moderate success (60%) in areas where it remained intact, it was prone to tearing over time. This necessitated frequent repairs and reinstallation, undermining its long-term viability as a standalone solution. In some cases, the netting was replaced with less effective chain-link materials, further reducing its efficacy.

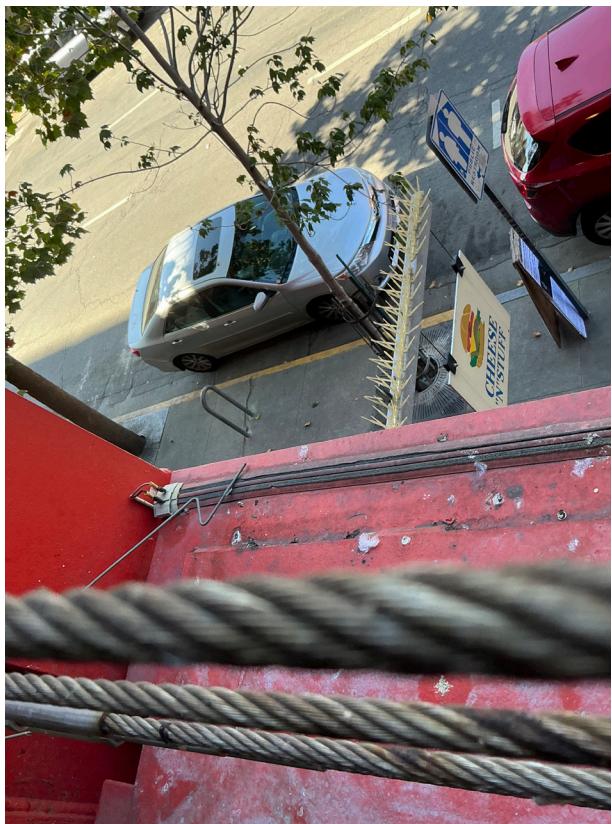
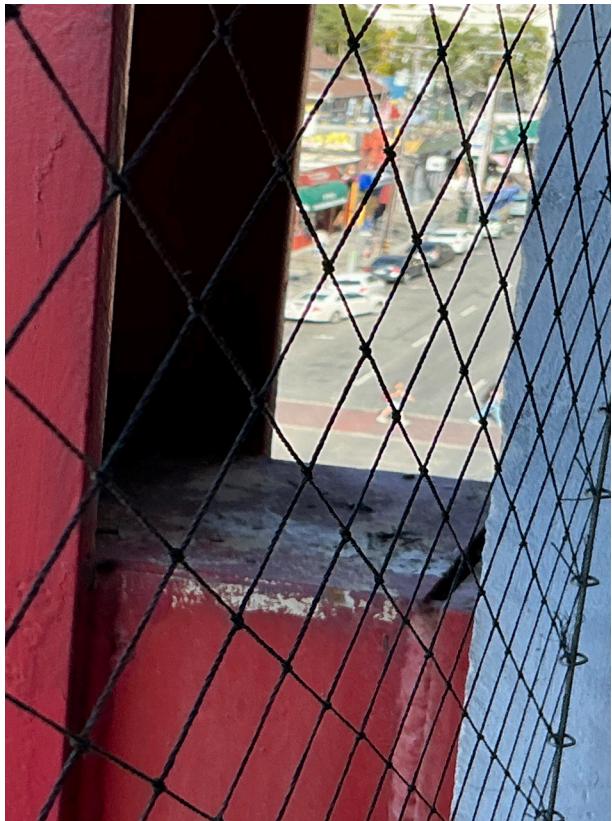
Sticky deterrents were applied to ledges and roosting surfaces to discourage pigeons from landing. Initially effective, this approach quickly lost its impact as debris and dirt accumulated, rendering the adhesive surfaces ineffective. The unattractive appearance of these solutions further detracted from their suitability

in a public-facing environment. With a success rate of 0% over time, sticky solutions proved to be an unsustainable option.

Electric shock strips were installed along edges to create a mild deterrent for roosting pigeons. While this method is effective when operational, the systems at the garage were not consistently maintained, leading to nonfunctional equipment. Without active current, these areas became prime roosting spots, reducing the method's overall success rate to 0%.



Previous Deterrent Methods





Spikes

Sometimes, the simple answer is the best..

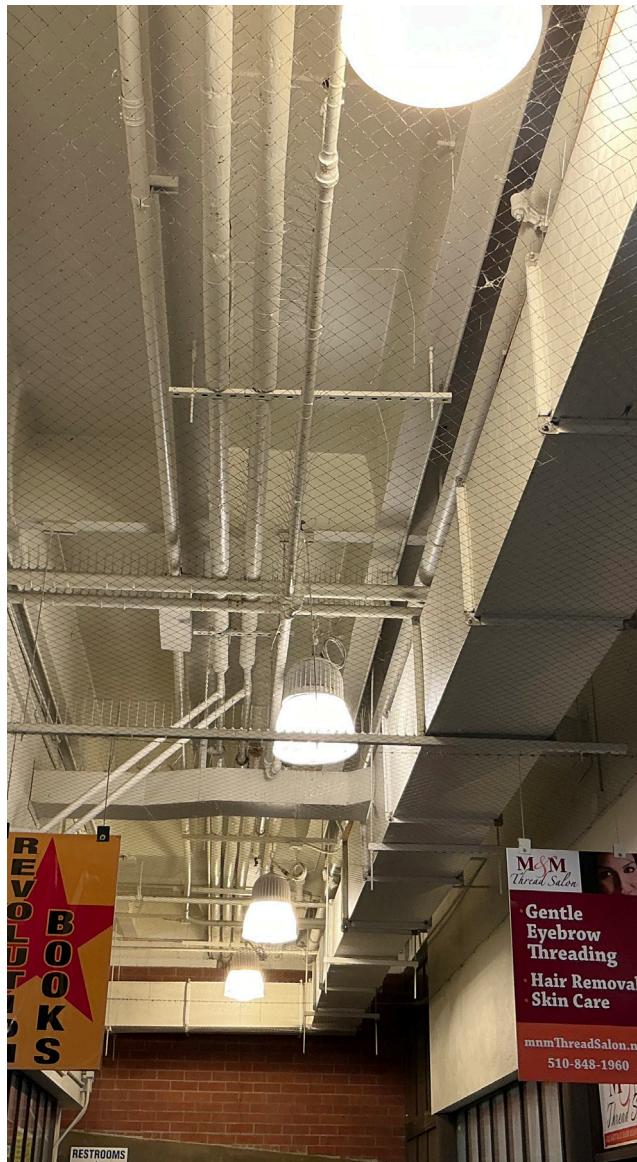
Bird spikes have been a highly effective deterrent at the Telegraph-Channing Garage, achieving a 90% success rate when properly implemented. By physically blocking pigeons from landing or roosting, spikes offer a simple, low-maintenance solution. However, inconsistent installation, such as leaving gaps or failing to reinstall spikes after repairs, has limited their effectiveness. Untreated areas quickly become new roosting spots.

While spikes require less maintenance than other methods, regular inspections are still essential to address debris buildup or damage. Poor integration can also detract from the garage's appearance. Despite these challenges, spikes remain a reliable and cost-effective tool for reducing pigeon activity when comprehensively applied and properly maintained.



Image Showing Effectiveness of Bird Spikes

This image highlights the deployment of spikes in one area, with a single spot left uncovered. While the spiked sections remain clean, the unprotected spot shows visible signs of pigeon activity, emphasizing the importance of comprehensive coverage.



Existing, Successful Spike Deployment

In the lobby near the restaurants, extensive spike coverage has kept the corridor pigeon-free in the high population restaurant. This clean, undisturbed area shows the effectiveness of thorough deterrent deployment.



Comprehensive Coverage

Ample coverage is essential for effective pigeon deterrence. Even a single missed spot can become a new roosting area, allowing pigeons to prevail despite other preventative measures.

Consistency is key to success.





Electric Shock System

No, we're not shocking the Pigeons.

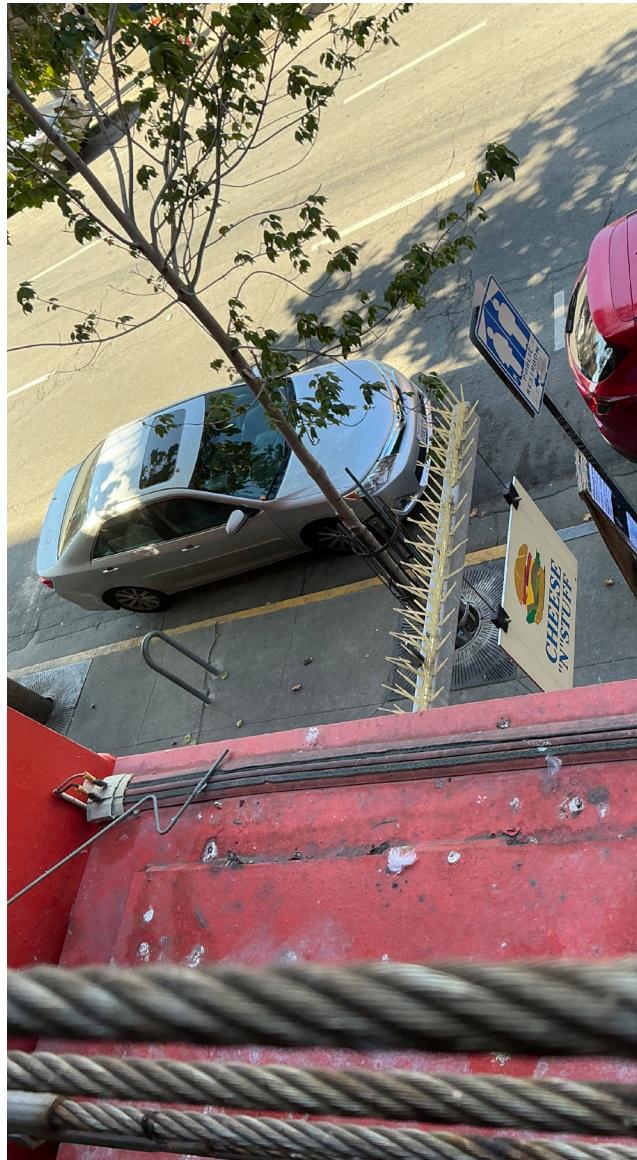
Electric shock systems were introduced at the Telegraph-Channing Garage to deter pigeons by delivering a mild, non-harmful shock. When functioning properly, they are effective and unobtrusive, making them a good option for areas where spikes are less suitable.

However, inconsistent maintenance and faulty wiring have left many sections inactive, allowing pigeons to return and roost on unprotected edges. Without regular checks and upkeep, the system fails to deliver its intended impact. The reliance on electricity also adds ongoing costs, and poor integration into a consistent maintenance routine has further diminished its effectiveness. While promising in theory, the lack of operational oversight at the garage has limited its success.



Image Showing Ineffectiveness of System

This image highlights the incomplete deployment of electric shock systems, with visible gaps where the system is inactive. The unprotected section shows clear signs of pigeon activity, underlining the critical need for consistent operational maintenance.



Inadequate Maintenance and Upkeep

Regular maintenance is essential for electric shock systems to remain effective. This image shows how neglect, such as faulty wiring or debris buildup, renders large portions of the system non-functional, allowing pigeons to return.



Inoperative System

A fully operational system is critical for success. This image illustrates the failure of inactive zones to deter pigeons, showcasing the importance of routine inspections and complete activation to maintain consistent results.





Sticky Solution

It's More Effective on Humans

Electric shock systems were introduced at the Telegraph-Channing Garage to deter pigeons by delivering a mild, non-harmful shock. When functioning properly, they are effective and unobtrusive, making them a good option for areas where spikes are less suitable.

However, inconsistent maintenance and faulty wiring have left many sections inactive, allowing pigeons to return and roost on unprotected edges. Without regular checks and upkeep, the system fails to deliver its intended impact. The reliance on electricity also adds ongoing costs, and poor integration into a consistent maintenance routine has further diminished its effectiveness. While promising in theory, the lack of operational oversight at the garage has limited its success.

← Image Showing Ineffectiveness of Solution

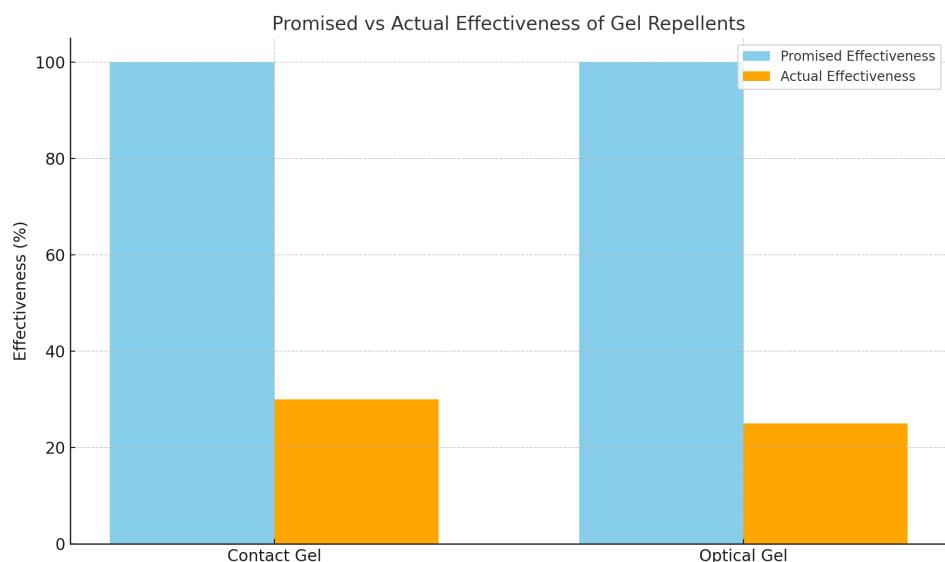
This image demonstrates how sticky deterrents fail over time. Dust, debris, and weathering obscure the adhesive, rendering the solution ineffective and allowing pigeons to return to previously treated areas.

Short-Term Solution →

Sticky deterrents degrade quickly and require constant upkeep. Without reapplication, they lose their grip, leaving surfaces unprotected and susceptible to pigeons.

Ineffective in Action ↓

This chart highlights the downfall of sticky solutions. Improper application and environmental exposure render this method unreliable, allowing pigeons to reclaim treated areas. (NLM)





Nylon Netting

Almost Perfect.

Nylon netting has been a moderately effective solution at the Telegraph-Channing Garage, successfully blocking pigeons from high-traffic interior areas. When intact, it prevents pigeons from entering and roosting, keeping key areas clean and functional. However, the durability of nylon netting has been a significant challenge. Over time, tears, wear, and poor maintenance have compromised its effectiveness, creating openings that pigeons quickly exploit.

While netting is visually discreet and effective in the short term, its susceptibility to damage and the need for frequent repairs make it less reliable over time. For nylon netting to remain an effective deterrent, consistent maintenance and high-quality materials are essential.

← **Image Showing Effective Deployment**

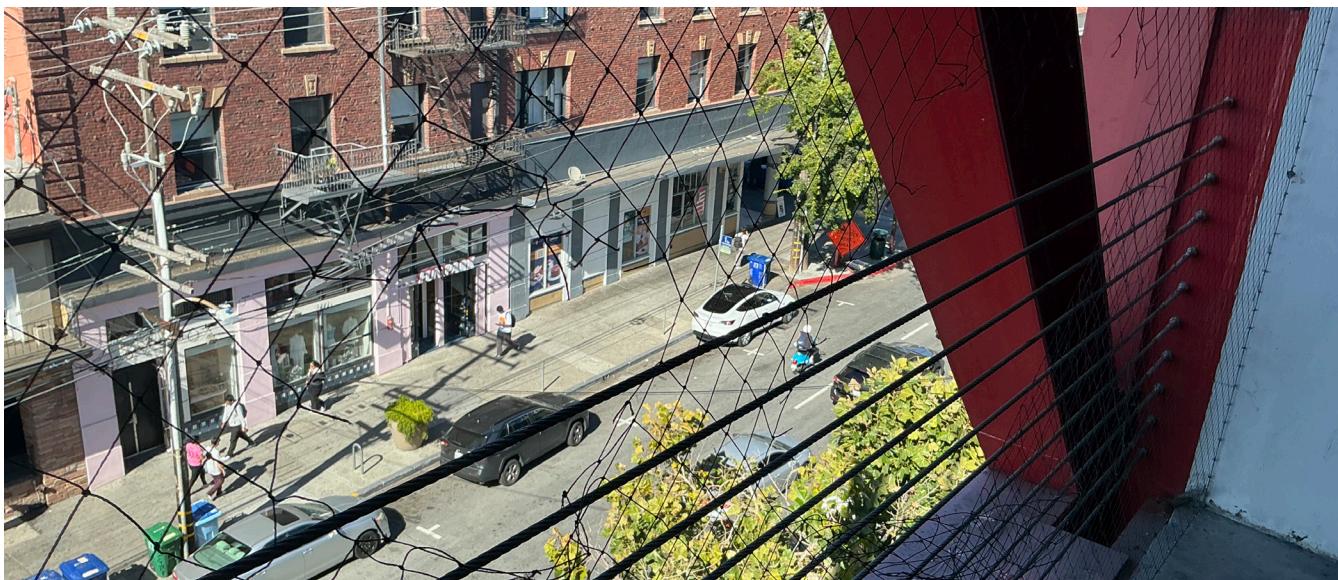
This image highlights the proper application of nylon netting in a high-traffic area. The netting is intact, covering all potential entry points, and effectively preventing pigeons from accessing the interior. The area remains clean and undisturbed, showcasing its potential when well-maintained.

Well-Deployed Netting in Lower Levels →

The netting installed on the lower levels near pedestrian corridors shows its ability to block pigeon entry. These areas remain free of roosting activity, proving the effectiveness of well-deployed netting in keeping pigeons out of critical zones.

Damaged Netting Leading to Gaps ↓

This image shows tears and gaps in the nylon netting caused by wear and insufficient maintenance. These vulnerabilities allow pigeons to bypass the barrier, reducing the netting's overall effectiveness.



What Worked

Over the course of our study and interventions at the Telegraph-Channing Garage, several deterrent strategies demonstrated notable effectiveness when implemented properly. These methods highlight the importance of consistent application, high-quality materials, and ongoing maintenance.

Bird Spikes

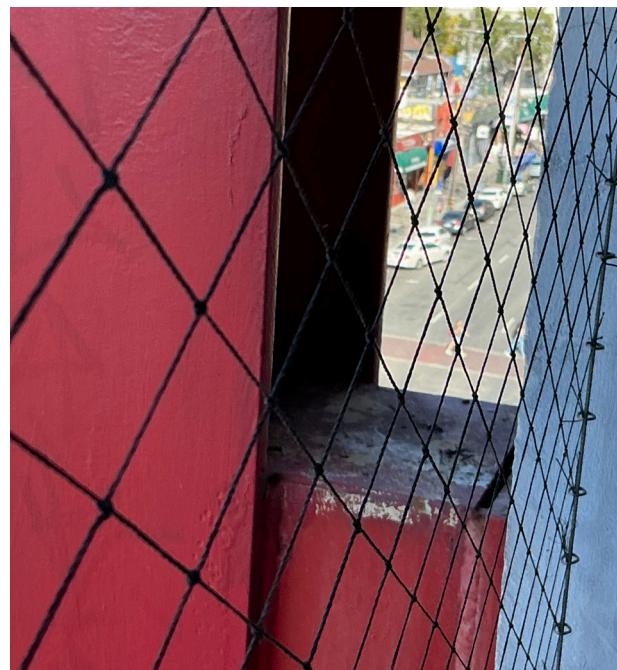
Bird spikes were the most consistently effective solution when installed comprehensively. By physically blocking pigeons from roosting, spikes achieved a 90% success rate in treated areas. Their low-maintenance requirements, once properly deployed, made them a reliable choice for high-risk surfaces such as ledges and beams. In areas where gaps were avoided and spikes were reinstalled after repairs, roosting activity was almost entirely eliminated.

Nylon Netting

When intact, nylon netting proved effective in blocking pigeons from accessing critical areas. Deployed on interior facades and high-traffic zones, the netting successfully prevented roosting and nesting. Its discreet appearance also made it a preferred option for maintaining the aesthetic integrity of the garage. Lower levels with well-maintained netting showed a clear reduction in pigeon activity.

Comprehensive Strategies

Where multiple solutions were combined, such as spikes on ledges paired with netting to block access points, the results were significantly improved. These layered approaches addressed different pigeon behaviors, from preventing entry to blocking roosting opportunities, creating an inhospitable environment for birds.



What We Learned

Despite successes, our interventions revealed critical insights into the challenges of urban pigeon management. These lessons can inform future efforts to create more effective and sustainable solutions.

1. Maintenance is Essential

Even the most effective deterrent systems lose their impact without regular upkeep. Gaps in spike coverage, torn nylon netting, and inactive electric shock systems allowed pigeons to adapt and exploit vulnerabilities. Regular inspections and repairs are essential to ensure the longevity and functionality of these solutions.

2. Consistency is Key

Partial deployment of deterrent methods undermines their effectiveness. For example, areas with comprehensive spike coverage remained pigeon-free, while gaps or inconsistencies allowed birds to roost. Future strategies must emphasize thorough, uninterrupted application to avoid creating weak points.

3. Durability Matters

Materials used in deterrent systems must withstand urban conditions, including weather, wear, and debris. Nylon netting, while initially effective, was prone to tearing and required frequent replacements. More durable materials, such as galvanized steel netting, should be considered for long-term solutions.



4. Behavior Adaptation of Pigeons

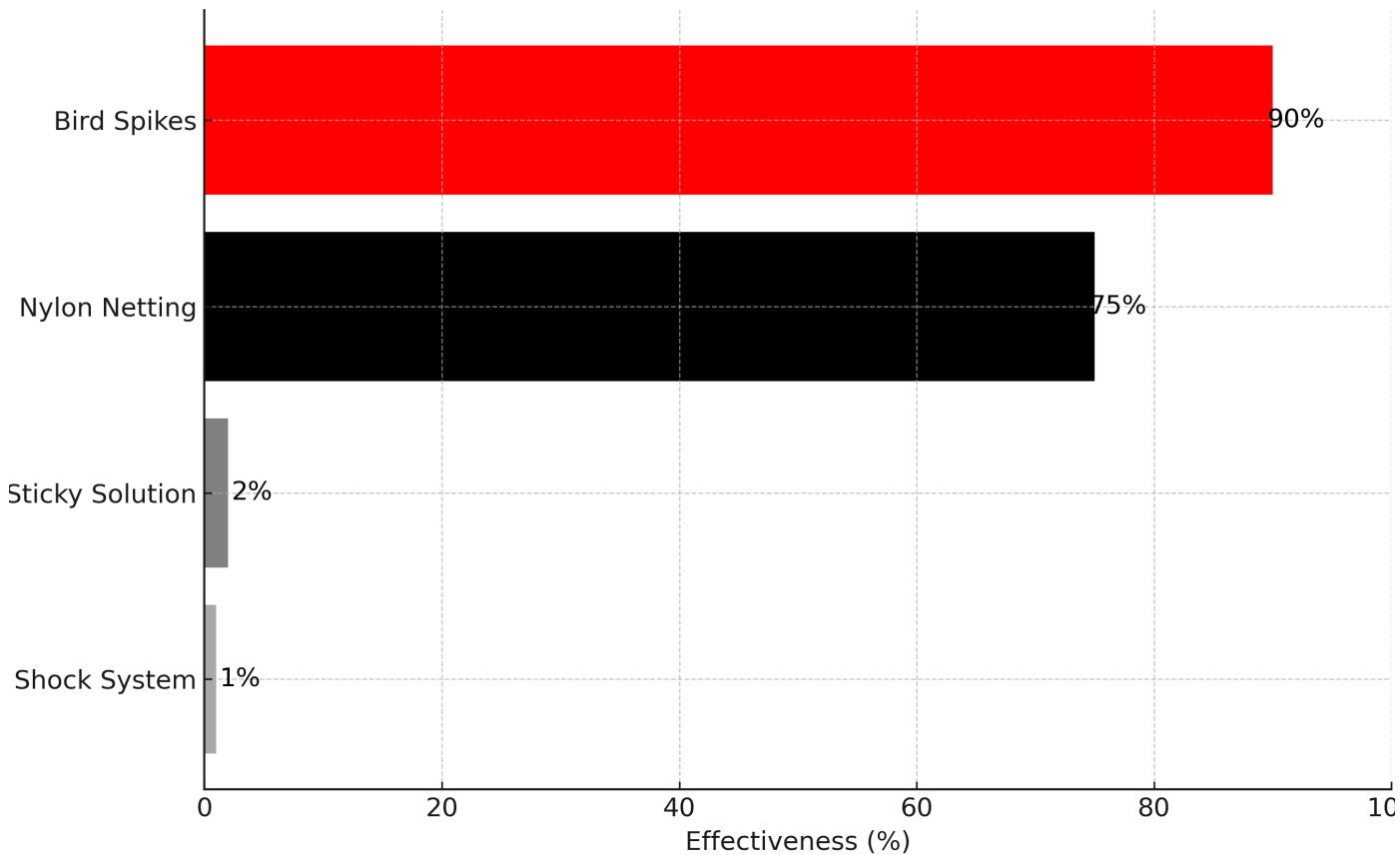
Pigeons are highly adaptive and can quickly exploit weak spots in deterrent systems. This adaptability underscores the need for a multi-faceted approach that addresses various pigeon behaviors, from roosting to nesting.

5. Community and Environmental Considerations

The proximity of restaurants and food vendors to the garage exacerbated the pigeon problem by providing a steady food source. Engaging local businesses to improve waste management practices is crucial for reducing attractants. Solutions must also balance effectiveness with humane treatment and aesthetic concerns, especially in public spaces.

Overall Effectiveness

The existing methods used at the Telegraph-Channing Garage include bird spikes, nylon netting, sticky solutions, and electric shock systems. Bird spikes have proven highly effective when installed comprehensively, physically preventing pigeons from roosting. Nylon netting is also effective in blocking access to key areas but requires frequent maintenance due to wear and tear. Sticky solutions and electric shock systems, however, have shown limited success; sticky solutions degrade quickly and lose effectiveness, while electric shock systems often fail due to inconsistent maintenance. Together, these methods highlight varying levels of success, with durability and upkeep being critical factors in their effectiveness.



What Didn't Work

Over the course of our study and interventions at the Telegraph-Channing Garage, several deterrent strategies demonstrated notable effectiveness when implemented properly. These methods highlight the importance of consistent application, high-quality materials, and ongoing maintenance.

Sticky Solutions

Sticky deterrents proved ineffective in the long term. While initially discouraging pigeons from landing, the adhesive quickly became covered with dust, debris, and bird droppings, rendering it useless. Additionally, the unappealing appearance of sticky residue detracted from the aesthetics of the garage and posed animal welfare concerns.

Electric Shock Systems

Electric shock systems, though promising in theory, were rendered ineffective by inconsistent maintenance and operational failures. Faulty wiring and inactive edges allowed pigeons to return to previously treated areas, significantly undermining their purpose. The reliance on electricity also introduced ongoing costs without delivering consistent results.

Inconsistent Coverage

Partial deployment of deterrent methods, such as gaps in spike coverage or torn nylon netting, created vulnerabilities that pigeons quickly exploited. These inconsistencies diminished the effectiveness of even the best deterrents, emphasizing the importance of thorough application.

Durability Issues

Nylon netting, while initially successful, often tore over time, leaving gaps that allowed pigeons to bypass the barrier. Sticky solutions degraded rapidly under environmental conditions, requiring frequent reapplication to maintain their functionality.

These shortcomings highlight the need for durable materials, consistent maintenance, and comprehensive application to achieve long-term effectiveness in pigeon deterrence.

Proposal Overview

Our proposed strategy for pigeon deterrence at the Telegraph-Channing Garage is a comprehensive, multi-faceted approach that prioritizes long-term effectiveness, cost efficiency, and humane methods. Building on the successes and failures of existing deterrent systems, our proposal integrates proven solutions with strategic improvements to address current challenges.

Expected Outcomes

The proposed strategy aims to achieve the following:

Immediate Impact

The proposed strategy is designed to achieve a noticeable decrease in pigeon activity across all treated areas within the first six months. By addressing key entry points and roosting areas comprehensively, combined with the integration of durable deterrents, this approach ensures a swift and effective response to the ongoing infestation problem.

Cost Savings

With the implementation of these measures, the need for frequent cleaning, repairs, and maintenance due to pigeon activity will be significantly reduced. The strategy is projected to lower annual maintenance costs by up to 75% after the initial investment, resulting in considerable long-term savings for the City of Berkeley.

Sustainability

By utilizing high-quality, durable materials such as galvanized steel netting and ensuring routine maintenance schedules, the proposed solutions will maintain their functionality over extended periods. This approach minimizes the need for constant replacement and repair, ensuring the deterrent systems remain effective for years to come.

Humane Solutions

All measures in this proposal prioritize the ethical treatment of pigeons by focusing on non-harmful deterrents, such as spikes, netting, and ultrasonic systems. These methods create an environment that discourages pigeons from settling without causing them harm, ensuring a cleaner, safer, and more functional space for garage users and the community.

Our Findings

1. Bird Spikes

Bird spikes remain a cornerstone of our approach due to their high effectiveness and low maintenance requirements. We propose a full-scale, gap-free installation across all horizontal surfaces, including ledges, beams, and structural exoskeletons. Ensuring comprehensive coverage will eliminate the weaknesses observed in previous applications, where gaps allowed pigeons to return.

2. Reinforced Netting

Replacing the current nylon netting with galvanized steel netting will improve durability and reduce maintenance needs. Steel netting provides a stronger, more reliable barrier against pigeons while maintaining the aesthetic integrity of the garage. This upgrade will be focused on high-traffic zones and vulnerable entry points.

3. Ultrasonic Deterrent Systems

We propose the installation of ultrasonic deterrent systems to address hard-to-reach areas, such as rooftops and gutters, where physical barriers are impractical. These systems emit high-frequency sounds undetectable to humans but uncomfortable for pigeons, discouraging them from nesting in these zones.



4. Community Engagement

Recognizing that food sources in the surrounding area contribute significantly to pigeon activity, we recommend collaborating with local businesses to improve waste management practices. Enforcing covered trash systems and reducing access to food waste will complement physical deterrents.

5. Maintenance Protocols

Our proposal emphasizes the importance of routine inspections and maintenance. Regular checks will ensure that all systems remain functional and effective, preventing the gradual degradation observed in current methods. Dedicated resources and clear protocols will be established to sustain the performance of deterrent measures over time.



More Spikes!!

Sometimes, the simple answer is the best.... Still...

Bird spikes are one of the most straightforward yet highly effective deterrent methods for managing pigeon activity. Designed to create an uneven and uncomfortable surface, these spikes prevent pigeons from landing or roosting on treated areas. At the Telegraph-Channing Garage, ledges, beams, and exoskeleton structures provide ample surfaces for pigeons to roost, making bird spikes an essential component of the overall strategy. However, consistent and comprehensive installation is critical for success; gaps or incomplete coverage can render the method ineffective.

At the Telegraph-Channing Garage, bird spikes target the most visible and problematic areas of pigeon activity—ledges, beams, and structural exteriors. These surfaces are often the first choice for pigeons seeking a roosting spot. By addressing these areas comprehensively, spikes drastically reduce the potential for pigeons to establish a presence, laying the foundation for the broader deterrent strategy.



High Success Rate

When installed without gaps or inconsistencies, bird spikes achieve a 90% success rate in deterring pigeons. They physically block access to roosting sites, reducing droppings and associated maintenance costs.



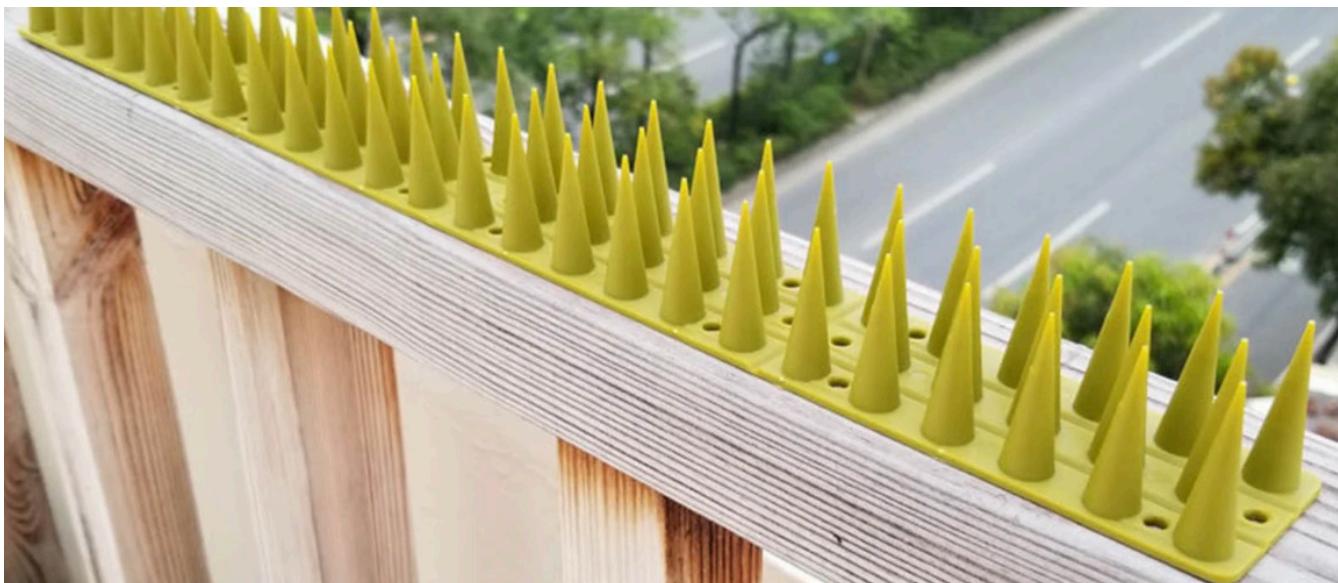
Durable Solution

Constructed from robust materials such as stainless steel or UV-resistant plastic, bird spikes are designed to withstand harsh weather conditions and debris buildup. Once installed correctly, they require minimal upkeep, offering a long-lasting solution for problem areas.



Aesthetic Neutrality

When properly installed, bird spikes can be visually discreet, blending into the building's structure without compromising its appearance. Their unobtrusive nature makes them a preferred choice for areas where aesthetics are a priority.



Upgraded Nets



Upgrade Nets

Take What Works and Make It Better!!

Replacing nylon netting with reinforced galvanized steel netting addresses the key vulnerabilities of the existing system at the Telegraph-Channing Garage. While nylon netting effectively blocks pigeons from entering high-traffic areas, it is prone to tears and frequent damage, compromising its long-term efficacy. Galvanized steel netting offers enhanced durability and reliability, making it an ideal choice for high-traffic zones and exposed areas. By using more robust materials, the upgraded netting will minimize maintenance requirements while providing comprehensive coverage to critical interior and exterior zones.

At the Telegraph-Channing Garage, open facades and high-traffic levels create easy access points for pigeons. Reinforced netting is critical to closing these gaps and preventing pigeons from nesting or roosting in protected areas. By upgrading to galvanized steel, the netting will provide comprehensive and reliable coverage, reducing the need for constant repairs and ensuring sustained pigeon deterrence.



Enhanced Durability

Galvanized steel netting is resistant to tearing, environmental wear, and human interference, making it significantly more reliable than nylon. This durability ensures that the barrier remains effective for years, even in high-stress urban environments.



Comprehensive Coverage

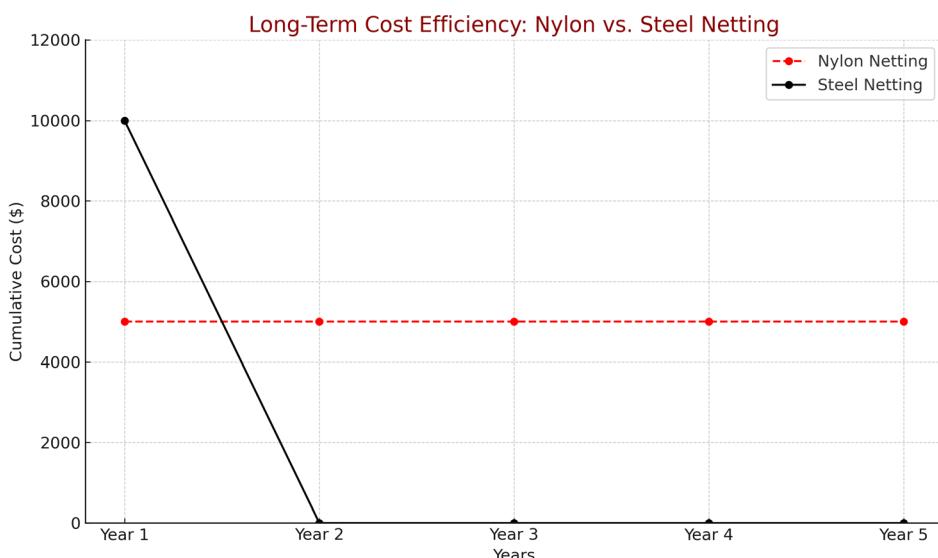
Steel netting can be customized to cover large, irregularly shaped areas, effectively sealing off entry points where pigeons frequently access.

Its structural integrity prevents pigeons from bypassing the barrier, ensuring consistent protection.



Long-Term Cost Efficiency

Although the initial investment is higher, galvanized steel netting's longer lifespan and reduced need for repairs offset upfront costs. This makes it a more economical solution compared to nylon netting, which requires frequent replacements.





Ultrasonic Deterrent

It is 2024, afterall...

Ultrasonic deterrent systems offer a modern, humane approach to pigeon management by emitting high-frequency sounds that are uncomfortable for pigeons but inaudible to humans. These systems are particularly effective in areas where physical barriers like spikes or netting are impractical, such as rooftops, gutters, and high-altitude ledges. Proper calibration and strategic placement are crucial for maximizing their deterrent effect, ensuring that pigeons perceive these zones as inhospitable.

Ultrasonic systems complement other deterrents by addressing areas that are difficult to cover with physical barriers. Their ability to deter pigeons without altering the structure or requiring major installation efforts makes them an essential component of the overall strategy. In the Telegraph-Channing Garage, they provide critical coverage for high-altitude and hard-to-access areas, reducing the risk of nesting and roosting in these locations.



Non-Invasive Solution

Unlike physical deterrents, ultrasonic systems do not alter the structure's appearance. Their discreet design ensures that the aesthetic integrity of the building is preserved while still discouraging pigeon activity.

Targeted Effectiveness

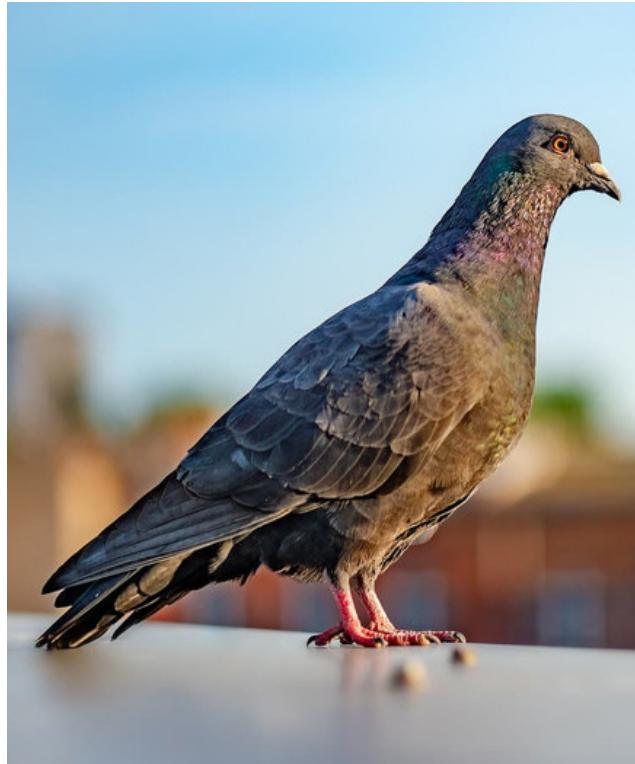


Ultrasonic deterrents are particularly useful for hard-to-reach areas like rooftops and gutters, where traditional methods are either impractical or ineffective. They fill critical gaps in coverage, ensuring no area becomes a refuge for pigeons.

Humane and Ethical



By leveraging behavioral discomfort rather than physical barriers, ultrasonic systems offer a non-harmful alternative that aligns with community and ethical standards for wildlife management.





The Total Package

What We Proposed, in A Nutshell.

The pigeon deterrence strategy for the Telegraph-Channing Garage combines three complementary methods—bird spikes, reinforced netting, and ultrasonic deterrent systems—into a holistic solution that addresses every aspect of the problem. Each component targets a specific pigeon behavior, and together they form an interconnected system that ensures long-term effectiveness and sustainability.

The integration of these methods ensures that no single behavior or roosting preference is left unaddressed. Bird spikes disrupt pigeons' ability to settle on exposed ledges, reinforced netting secures entry points and prevents nesting, and ultrasonic systems deter activity in hard-to-reach areas. This layered approach creates a cohesive barrier, reducing the likelihood of pigeons adapting or finding alternative spaces within the garage. By targeting both physical and behavioral patterns, the strategy maximizes effectiveness while requiring minimal ongoing intervention.



More Bird Spikes

Bird spikes prevent pigeons from landing or roosting on exposed surfaces like ledges, beams, and exoskeleton structures. By covering these high-risk areas, they form the first line of defense against pigeon activity.

Reinforced, Stronger Netting



Upgraded galvanized steel netting blocks access to interior levels and entry points where pigeons typically nest. It complements bird spikes by ensuring that protected areas remain inaccessible, even in high-traffic zones.

Ultrasonic Deterrents



Ultrasonic systems provide coverage for hard-to-reach areas such as rooftops and gutters, where physical barriers are impractical. These systems create an additional layer of deterrence, ensuring no zone becomes a refuge for pigeons.



Budget Breakdown

The proposed \$10,000 budget for implementing the pigeon deterrence strategy at the Telegraph-Channing Garage has been carefully allocated to maximize effectiveness while ensuring financial feasibility. Each component of the strategy addresses a specific aspect of the pigeon problem, creating a comprehensive solution.

Bird Spikes (\$5,000): The largest portion of the budget is dedicated to bird spikes, which are essential for preventing pigeons from roosting on ledges and structural elements. This includes materials and labor for installation across all identified areas.

Reinforced Netting (\$3,000): Upgrading nylon netting to galvanized steel will block pigeons from accessing interior levels and high-traffic areas. This investment focuses on durability and long-term effectiveness.

Ultrasonic Systems (\$2,000): Ultrasonic deterrent systems will cover hard-to-reach areas, such as rooftops and gutters, providing a non-invasive layer of protection where physical barriers are impractical.

Maintenance and Monitoring (\$1,000): A portion of the budget is reserved for routine inspections and minor adjustments to ensure all systems remain functional and effective over time. Strategic Investment

This allocation reflects a balance between immediate impact and long-term sustainability. Durable materials, such as steel netting and stainless steel spikes, minimize future costs, while ultrasonic systems address gaps in physical coverage. The inclusion of maintenance ensures that the deterrents remain effective, protecting the investment and maximizing value.

By prioritizing key areas and leveraging proven solutions, this budget provides a clear path to achieving a cleaner, more functional garage while reducing ongoing maintenance costs.

Projected Savings

Implementing the proposed pigeon deterrence strategy at the Telegraph-Channing Garage is expected to result in substantial financial savings over time. Currently, the City of Berkeley spends \$20,000 annually on cleaning and maintenance to address pigeon-related issues. By deploying bird spikes, reinforced netting, and ultrasonic deterrent systems, the need for frequent cleaning will be drastically reduced, leading to significant cost reductions.

Year-by-Year Analysis

Year 1-2: During the initial phase of implementation, cleaning visits are expected to decrease from four to two per year, reducing annual costs to \$15,000. This accounts for the transition period while the deterrent systems are fully installed and operational.

Year 3 and Beyond: Once all systems are established and maintenance protocols are in place, annual cleaning visits are projected to drop to one per year, bringing costs down to \$5,000 annually.

Cumulative Savings

Over a five-year period, the deterrent strategy is projected to save the city \$75,000 in cleaning and maintenance costs compared to the current approach. This represents a 75% reduction in annual expenditures after the initial investment, making the strategy not only effective but also financially sustainable.

This projected cost efficiency demonstrates the long-term value of the comprehensive deterrence strategy, providing a cleaner, more functional garage while significantly reducing the burden on city resources.



City of Berkeley Pigeon Deterrence Strategy

Review and Recommendations

Community Design Outreach Team

University of San Francisco Architecture

ARCH 400CEL Fall 2024

Under the direction of Professor Seth Wachtel

Overall Budget and Long Term Cost Savings

To implement this pigeon deterrence strategy, we propose a two-year budget plan with an overall investment of \$10,000, allocated as \$5,000 per year. This investment will cover the installation of spikes, reinforced netting, and the ultrasonic deterrent system.

Projected Cost Reductions

Currently, the City of Berkeley spends approximately \$20,000 annually on four cleaning visits to manage pigeon-related maintenance. By implementing these deterrents, we expect to reduce cleaning needs to 2-3 visits per year during the first two years of installation.

- **Year 1-2:** With only two or three cleaning visits per year, the budget will allow for both deterrent installation and a reduction in maintenance costs.
- **Year 3 and Beyond:** Once the deterrent system is fully established, we expect maintenance to drop to one annual cleaning, lowering costs to approximately \$5,000 per year.

This strategy would effectively reduce the annual cleaning costs from \$20,000 to \$5,000 after the initial \$10,000 investment, saving \$15,000 each year beginning in year three.

Problem Overview

The City of Berkeley incurs an **annual expense** of **\$20,000** for the cleaning and maintenance of the **Telegraph-Channing Garage due to bird droppings**. Despite the implementation of various deterrent strategies, only a limited number have demonstrated effectiveness in reducing the presence of birds. As a result, the City continues to face significant costs without a sustainable solution in place.

Current Methods Include:

Method	Deployment Strategy	Pain Points	Success Rating
Spikes	Deployed along the interior edges of the building and inside the building	When repairs are conducted in spiked areas and spikes are not reinstalled, birds quickly swarm these open spots.	90% - Highly effective at blocking pigeons where deployed.
Nylon Netting	Netting is installed, primarily on the inside of the exterior façade levels of the garage.	Tears over time and require maintenance and reinstallation.	60% - Effective at blocking pigeons from interiors where netting is intact.
Sticky Solution	Applied to interior and exterior where pigeons roost.	Very quick loss of effectiveness due to debris buildup; unappealing appearance.	0% - Currently ineffective; pigeons have returned as the solution is now obscured."
Electric shock system	Electric shock system installed along edges, sometimes supplemented with spikes, to deter roosting.	Ineffective without consistent maintenance; pigeons can still roost. Upon visit, no edge was active.	0% - Currently not operating, therefore not successful.

Solution 1: Installation of Bird Deterrent Spikes

Issue Addressed:

Pigeons frequently roost on ledges, facades, and other surfaces within the garage, leading to significant accumulation of droppings on both exterior and interior surfaces. This creates a maintenance challenge, as these areas are difficult to clean and require frequent attention to remain presentable and hygienic.

Proposed Solution:

The installation of bird deterrent spikes along all ledges, facades, and potential resting surfaces within the garage. These spikes discourage pigeons from landing or roosting on these surfaces.

Strategic Rationale:

Bird spikes are a widely recognized and effective deterrent that physically prevents birds from landing on surfaces. Unlike electric shock systems, which require ongoing energy usage and maintenance, spikes are a passive deterrent that requires minimal maintenance once installed. By covering all resting surfaces with spikes, we can significantly reduce pigeon-related issues at these spots.

Deployment Plan:

- Remove existing electric shock systems from all relevant surfaces.
- Install bird deterrent spikes on all ledges, windowsills, beams, and other potential roosting points throughout the garage's interior and exterior.
- Ensure that spikes are installed at an angle that maximizes their effectiveness without affecting the aesthetics of the structure.

Why This Solution Over Others:

Spikes are a cost-effective, low-maintenance solution that directly addresses the problem of pigeons landing on ledges and other surfaces. Other deterrent options, like electric shocks, require regular maintenance and power, whereas spikes provide a physical barrier that deters roosting naturally.

Unique Focus of this Solution:

Spikes specifically address the need to prevent pigeons from resting on building surfaces.

Unlike the netting, which blocks entry to specific areas, or the ultrasonic system, which influences behavior through sound deterrents, the spikes serve as a direct physical barrier, targeting resting behavior on specific structural elements.

Solution 2: Reinforced Netting for Key Areas**Issue Addressed:**

Pigeons frequently access interior areas of the garage, particularly the first four north-facing levels where nearby restaurants attract them. Current nylon netting is insufficient, as it tears easily and cannot withstand long-term use in these high-traffic areas.

Proposed Solution:

Replace existing nylon netting with galvanized steel netting on the first four north-facing levels. This more durable material will prevent pigeons from entering and roosting in these areas.

Strategic Rationale:

Galvanized steel netting is more durable and resistant to both bird activity and human wear and tear. By strengthening these areas, we can prevent pigeons from accessing the interior of the garage, reducing maintenance costs associated with cleaning and repair in these high-traffic levels.

Deployment Plan:

- Dismantle the current nylon netting on the first four north-facing levels.
- Install galvanized steel netting across these levels to form a continuous, sturdy barrier against pigeon entry.

Why This Solution Over Others:

Steel netting offers a longer-lasting, more resilient solution than nylon, addressing the specific

problem of pigeons entering and inhabiting the interior of the garage. This solution is superior to spikes in this context, as spikes would not prevent entry into these specific zones, and ultrasonic deterrents may not cover all entry points effectively.

Unique Focus of this Solution:

Netting focuses on restricting access to particular interior areas of the garage. While spikes address surface resting areas and the ultrasonic system deters presence through sound, netting is a critical barrier that prevents pigeons from entering and nesting in areas where they're currently causing disruptions.



Solution 3: Ultrasonic Predator Deterrent System

Issue Addressed:

Pigeons regularly occupy roof and gutter areas, leading to nesting and buildup of droppings in these hard-to-reach spaces. This problem is not adequately addressed by physical barriers or deterrents alone, as pigeons have a strong preference for higher, sheltered spots.

Proposed Solution:

Install an ultrasonic predator deterrent system, which emits high-frequency sounds that deter pigeons from entering or roosting in these areas. This system will be positioned on the roof and within the fenced gutter on the east side of the garage.

Strategic Rationale:

Ultrasonic deterrent systems are effective in creating an environment that pigeons perceive as unsafe due to the emitted predator-like sounds. These high-frequency sounds, undetectable to

the human ear, target pigeons specifically without disturbing residents, pedestrians, or garage users.

Deployment Plan:

- Position ultrasonic speakers on the rooftop and inside the fenced gutter area on the east side.
- Calibrate the system to emit sounds at frequencies effective for pigeon deterrence but inaudible to humans.
- Schedule periodic maintenance to ensure continued function, with adjustments as needed based on pigeon activity and deterrent effectiveness.

Why This Solution Over Others:

The ultrasonic system is a non-intrusive solution that deters pigeons through sound without physical barriers. It is particularly effective in areas where pigeons gather but where netting or spikes are impractical. This system also avoids the visual impact of spikes or netting, maintaining the aesthetic integrity of the roofline.

Unique Focus of this Solution:

The ultrasonic system specifically targets pigeons' auditory perception to influence their behavior. Unlike spikes, which prevent resting on surfaces, or netting, which blocks access to certain zones, the ultrasonic deterrent keeps pigeons away from the entire area, particularly the roof and gutters, by making these spaces feel inhospitable.



Overview:

1. Bird Deterrent Spikes

We propose replacing the existing electric shock system with bird deterrent spikes on all ledges and surfaces. These spikes effectively prevent pigeons from roosting,

reducing droppings and maintenance costs by discouraging them from landing on these areas.

2. Reinforced Netting for Key Areas

To block pigeons from high-traffic zones, particularly on the first four north-facing levels, we recommend installing durable galvanized steel netting. Unlike the current nylon, steel netting resists tearing and provides a strong barrier, effectively keeping pigeons out of the garage's busiest sections.

3. Ultrasonic Predator Deterrent System

This system will emit high-frequency sounds from the roof and east-side gutter, deterring pigeons without affecting humans. By creating a threatening sound environment, the ultrasonic deterrent prevents pigeons from nesting in these difficult-to-reach areas.

Summary of Solution Interdependencies

Each solution in this three-part strategy addresses a distinct aspect of the pigeon problem:

- **Spikes** target physical resting and roosting surfaces.
- **Netting** restricts access to interior zones where pigeons may enter and nest.
- **Ultrasonic deterrents** prevent occupation of hard-to-reach areas like the roof and gutters.

Summary and Conclusion

Some Closing Thoughts....

The Telegraph-Channing Garage pigeon deterrence project represents a thoughtful, evidence-based approach to mitigating the challenges posed by urban pigeon populations. Through a combination of proven strategies—bird spikes, reinforced netting, and ultrasonic deterrent systems—this proposal offers a comprehensive, humane, and sustainable solution to an ongoing issue. Each method has been carefully selected to address specific aspects of pigeon behavior while complementing the others, ensuring complete coverage and long-term success.

Bird Spikes: A highly effective and low-maintenance solution that physically prevents pigeons from roosting on ledges and beams. Their proper deployment is central to reducing visible pigeon activity.

Reinforced Netting: Durable galvanized steel netting will block access to interior and high-traffic areas, resolving the vulnerabilities of the current nylon netting system.

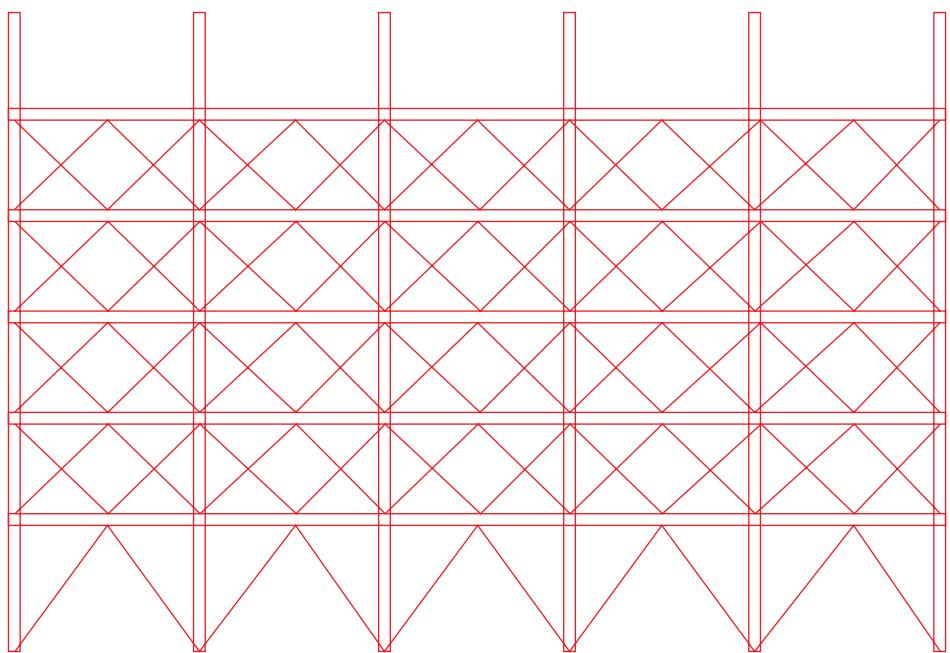
Ultrasonic Systems: Non-intrusive deterrent systems add a critical layer of protection for hard-to-reach areas, ensuring that all potential roosting spots are addressed.

Projected Outcomes: The strategy will reduce cleaning and maintenance costs by up to 75% after the initial implementation phase, saving the City of Berkeley significant resources while creating a cleaner, more functional space.



This project underscores the importance of integrating thoughtful design, durable materials, and humane practices in urban wildlife management. By addressing the root causes of pigeon activity and deploying solutions that complement one another, this strategy not only resolves the immediate problem but also sets a precedent for sustainable urban infrastructure.

The Telegraph-Channing Garage can become a model for how cities balance human needs with coexistence in urban environments. Through this proposal, Berkeley takes a step forward in creating cleaner, safer, and more cost-efficient public spaces, benefiting the community for years to come.



This presentation was created by **Avelino J. Cortina IV** on behalf of
ARCH 400CEL, under the direction of Professor Seth Wachtel, as
part of the Community Design Outreach program at the University of
San Francisco.