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New York City's New and Improved Construction Noise Regulation

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ABSTRACT

New York City recently updated its construction noise regulation in response to public desire to improve the quality of life in the city. In 2002 Mayor Michael Bloomberg initiated the first overhaul of the City's Noise Code in 30 years. After an extensive inclusive process involving the public, advocates, and industry representatives, an equitable new Noise Code was developed. The law was unanimously approved by the New York City Council and signed into law by the mayor in 2005 with an effective date of July 1st, 2007. The City's Department of Environmental Protection (NYCDEP) assembled a team of construction noise experts to assist in researching currently available noise control methods, establishing meaningful noise criteria, setting requirements for contractors to follow, imposing the concept of 'cure periods', and reasonable fines for non-compliance. After several years of consensus building the new and improved construction noise regulations were ready. The new regulations emphasize proactive avoidance of construction noise by requiring contractors to develop Noise Mitigation Plans. Guidelines are also provided for mitigating particularly loud construction devices such as pile drivers, hoe rams, concrete saws, vac-trucks, and jackhammers. It is expected that many other cities will be watching New York City carefully as they consider updating their own noise regulations as well.

1. INTRODUCTION

Honk – bang – whir – whiz – roar – ding – beep – chug – boom – rattle – hum – screech – boom. The familiar sounds of any densely populated city, especially to those living in New York City. To many these sounds are taken in stride as simply being an unavoidable and inescapable consequence of life in the city. But does this truly have to be the case?

Excessive noise exposure, especially in this case from construction activities, can interfere with people's enjoyment of their lives, create annoyance and confusion, disrupt necessary activities such as sleeping, hinder students from learning, and even manifest physically in the form of elevated blood pressure, gastro-intestinal problems, stress and anxiety. Indeed, according to a recent survey (as shown in Figure 1) of New York City inhabitants conducted by

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an independent citizen's action committee, respondents indicated that *noise* was their number one concern for their quality of life¹.

Statistically, noise is the number one complaint to New York City's 311 citizen service hotline, which in recent years could average nearly 1,000 calls a day. NYCDEP, as shown in Figure 2, continues to receive nearly 5,000 noise complaints per month as its portion of the overall complaints received by the 311 hotline.

Starting in 2002, Mayor Michael Bloomberg announced a special initiative named Operation Silent Night. This was a Quality-of-Life-Initiative that targeted areas of the City affected by loud and excessive noise. On October 2nd, 2002, the Mayor said *"Operation Silent Night aims to effectively fight and control the loud, excessive noise that plagues too many neighborhoods throughout the five boroughs. This coordinated, multi-agency initiative will specifically target those locations where noise adversely affects our everyday lives so New Yorkers may live, work, and enjoy the City in peace."* He also explained that the Department of Environmental Protection will be working to update the City's noise code to reflect a new set of issues and to vigorously enforce the code in those communities most often plagued by excessive noise *"to make the Code more specific and to make enforcement more effective."*

On December 21st, 2005, the mayor praised the unanimous City Council vote that led to the historic passage of the revision of the Noise Code. He went on to say, *"The new code will make New York a quieter place to live and work by decreasing excessive and annoying noise. The new code will specifically decrease noise from construction sites, motorcycles, 'boom cars', air conditioners and nightclubs by strengthening standards and implementing commonsense solutions."* He praised the collaboration between the City, the construction and nightlife industries, neighborhood groups and the City Council. On December 29th, 2005, the mayor signed the legislation overhauling the noise code in the presence of NYCDEP Commissioner Emily Lloyd, Deputy Commissioner Robert Avaltroni, Air & Noise Permits Director Gerry Kelpin, Assistant Counsel Charles Shamoon and other key NYCDEP staff.

To accomplish this ambitious goal the City would need to update its 30 year old noise regulation and develop new guidelines specifically intended to reduce construction noise citywide. While seemingly an idea that would appeal widely, the initiative was not without its critics. Change is often difficult, and people can be resistant to change, even when the overall goal would be an improvement in people's lives. These concerns can be even further magnified when there might be economic consequences associated with complying with the new Rules.

The mayor assigned the task to the New York City Department of Environmental Protection (NYCDEP) to address the problem by updating the City's noise laws and developing source-specific mitigation solutions for construction equipment. The costs and consequences associated with noise mitigation were to be carefully considered by NYCDEP as well.

2. OVERVIEW

On December 29th, 2005, Mayor Bloomberg signed Local Law 113 for the year 2005. The law amended the Administrative Code of the City of New York in relation to the Noise Control Code to provide a more practical and effective means of regulating construction noise. Specifically, the law established standards and procedures regarding construction noise management to reduce noise levels from construction, and established sound level criteria for specific noise sources. The law in section 24-219 of the Administrative Code also mandated the adoption of Rules prescribing noise mitigation strategies, methods, procedures and technologies that shall be used at construction sites whenever certain listed construction devices or activities set forth in the Rules are employed or performed.

The new Rule, which amends Title 15 of the Rules of the City of New York (RCNY) by adding a new Chapter 28, establishes the requirement that contractors develop and implement Noise Mitigation Plans prior to performing construction work within the City. The new Rule describes acceptable work hours, after-hour restrictions, and guidelines for the use of noise mitigation barriers around work sites. The new Rule describes concerns with particularly noisy construction equipment and provides examples of various methods of noise mitigation for each piece of equipment for the contractor to consider. Finally, the new Rule establishes noise emission criteria limits for all generic types of construction equipment in accordance with new Federal Highway Administration (FHWA) Guidelines². NYCDEP will utilize the FHWA guidelines during complaint-based site inspections to determine which construction devices need further noise mitigation and will work with the contractor to achieve the improvement necessary.

Procedurally, upon receiving noise complaints from the public, NYCDEP noise inspectors will be dispatched to the site to review the contractor’s Noise Mitigation Plan. If a violation is found the contractor will be afforded a ‘cure period’ to achieve compliance. If the contractor does not feel that compliance is possible they can then file and seek approval of an Alternative Noise Plan within the spirit of the Code to mitigate noise in a reasonable way.

The new Noise Code and Construction Noise Rules went into effect on July 1st, 2007.

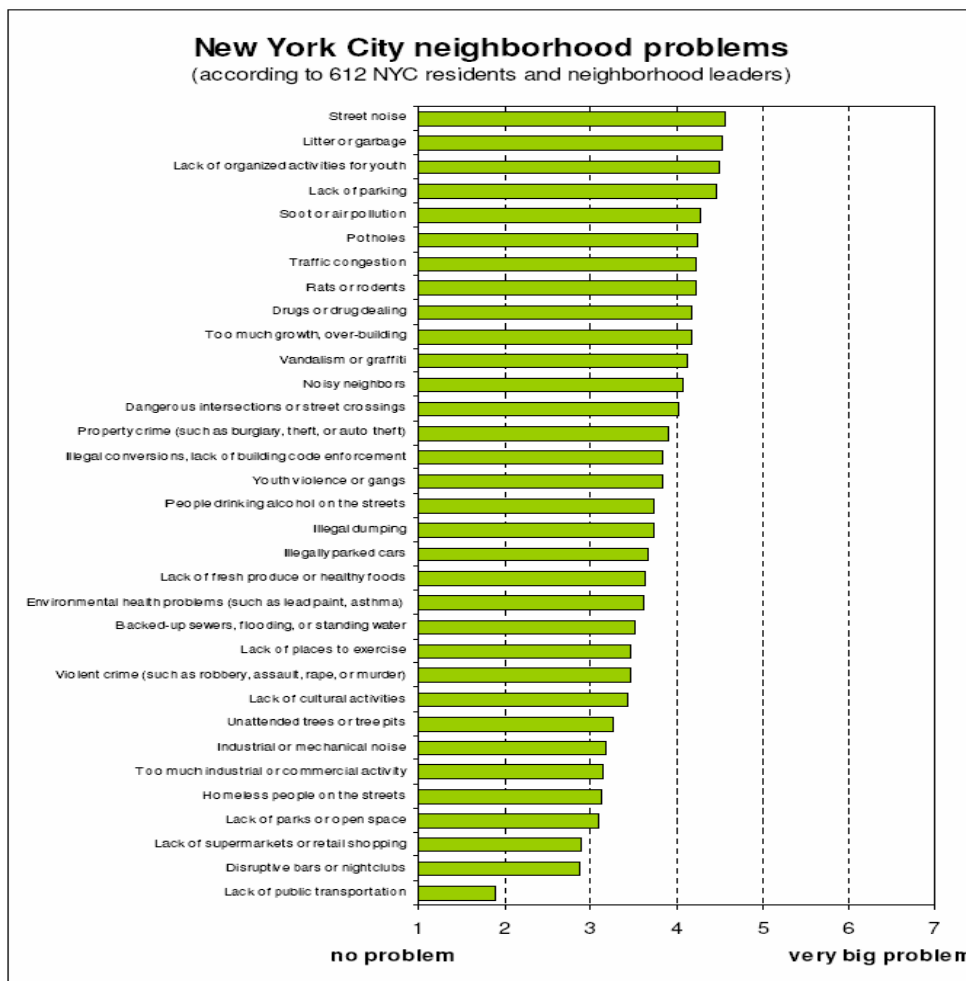
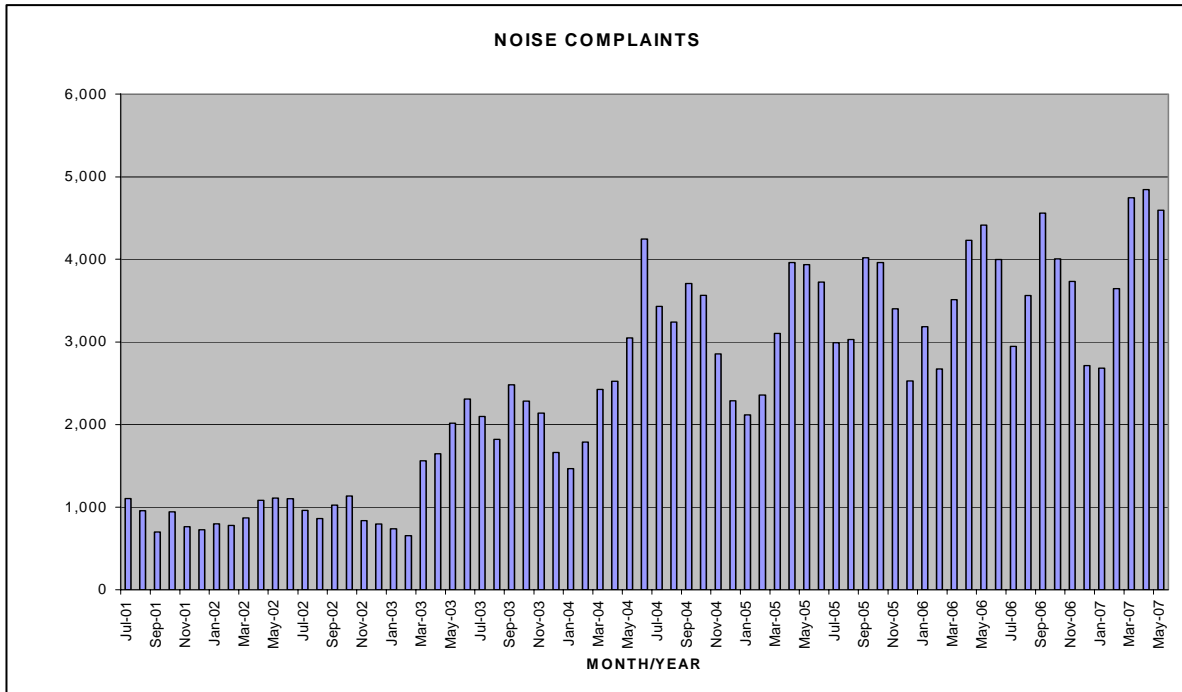


Figure 1: Summary Findings of Neighborhood Quality of Life Survey
(Source: Citizens for NYC)



**Figure 2: Noise Complaints to New York City's 311 Hotline
(Source: New York City Dept. of Environmental Protection)**

3. THE TEAM APPROACH

Collaboration was a key facet of the successful passage of the noise code legislation. NYCDEP conducted an all inclusive process. NYCDEP met with community boards and citywide advocates such as the League of the Hard of Hearing. The Department reached out to well-known experts in the noise mitigation field namely, Eric Zwerling of Rutgers University and Erich Thalheimer of Parsons Brinckerhoff (PB). NYCDEP met with trade associations and leading business groups including the Real Estate Board, the Building Owners and Managers Group, the General Contractors Association, the Nightlife Association, the Restaurant Association, Heavy Equipment Contractors, Licensed Plumbers, Affordable Housing, Small Home Builders, and Unions. NYCDEP also included input from major City utilities including Keyspan, Verizon, Con Ed and Empire City Subway. The Department even went so far as to meet with food vendors such as Mr. Softie Ice Cream.

NYCDEP also met with its sister City agencies, especially those who were also involved in construction. NYCDEP met or consulted with the City Department of Design and Construction, the Department of Transportation, the Department of Buildings, the Department of Health and Mental Hygiene, the Department of Consumer Affairs, the Department of Sanitation, and the Departments of City Planning and Small Business Services.

Meeting after meeting was held with these groups until they were satisfied with the Code.

4. GOOD TIMING

The timing for updating New York City's construction noise regulations could not have been better. In nearby Boston, the Central Artery/Tunnel Project (The Big Dig) was nearing completion. Valuable, precedent setting, lessons had been learned by Big Dig project staff from having successfully dealt with perpetual construction noise for well over a decade in a densely

populated urban environment³. Concurrently, Federal Highway Administration (FHWA) was also updating their nearly 35 year old policy and prediction model regarding construction noise².

The FHWA team consisted of construction and noise mitigation experts who were synthesizing the lessons learned from dozens of construction projects nationwide. Indeed at the time, the subject of construction noise was getting more public attention and research focus by professional societies and industry experts⁴. With modern communications, networking and the Internet, residents and regulators alike were sharing their experiences managing construction noise from projects large and small.

NYCDEP arranged for several information presentations featuring noise engineers from the Big Dig to explain the strategies and methods with which their project dealt with construction noise. Attendees to these information sessions included members from the General Contractors Association (GCA) and NYCDEP's sister construction agencies including the Department of Design and Construction and the Department of Transportation.

5. REGULATION STRATEGY

The Regulation's overall strategy is to *proactively avoid* as much construction noise as possible, yet retain NYCDEP's ability to *react and enforce* the new Rules in the event construction noise conditions warrant. However, as with all legislation, there must be room for compromise because construction operations must be allowed to continue for the growth and betterment of the City. It was equally important to avoid causing an undue economic burden for contractors so that they would be more willing to implement and adhere to the new regulations.

For these reasons NYCDEP carefully crafted the new regulations to ensure that the required noise mitigation measures were both reasonable and feasible. In these regards the lessons learned from other large construction projects were particularly useful. Specific noise mitigation rules were developed for each generic type of noisy construction equipment based on mitigation methods that had proven to be effective on these other projects. In this manner contractors could not argue the feasibility aspects of the Rules. However, the reasonability (i.e. cost) issue remained a prime concern as NYCDEP continued to work in close coordination with potentially affected contractors and utilities.

6. REGULATION SPECIFICS

The new Rule governs how contractors will need to implement plans and take action to reduce construction noise. As such, the specific requirements in the new Rule are as follows:

A. Noise Mitigation Plan

- Contractors will need to develop, and post conspicuously for inspection and review, a suitable Noise Mitigation Plan detailing the steps and mitigation measures they will use to control construction noise. NYCDEP will allow for Alternative Noise Mitigation Plans and Utility Noise Mitigation Plans for special purposes.

B. Required General Noise Mitigation Measures

- Contractors will certify that all the equipment used on site will comply with noise emission limits (see Table 1) recently promulgated by FHWA² in which specific L_{max} limits (in dBA, slow) at 50 feet are provided for generic types of equipment. If noise complaints are received, NYCDEP inspectors will measure and evaluate noise emissions from the contractor's equipment to ensure compliance with the FHWA guidelines. If necessary NYCDEP will allow a 'cure period' for the contractor to comply.

- All devices must be equipped with appropriate mufflers and silencers.
- Housing doors on equipment will be shut during operations, and the equipment will operate at the lowest possible power level.
- Portable small equipment, such as generators, pumps, and compressors, will be covered with a noise enclosure.
- New construction vehicles, as of model year 2008, will be outfitted with quieter-type manually-adjustable or automatically-adjustable backup alarms.
- A noise barrier or curtain system will be used around the perimeter of the job site when the site is within 200 feet of a receptor. The contractor will need to ensure that the barriers are free of any gaps and are well maintained to be effective.
- The contractor will ensure that laborers in the field have been trained with respect to these new Rules and to minimize noise emissions while working on the job site.
- The contractor will coordinate and cooperate with nearby noise sensitive receptors in an effort to avoid as much disturbance as possible.
- Normal hours for construction will be 7:00 AM to 6:00 PM. The contractor will be able to work during after-hours providing that NYCDEP concurs with the contractor's Noise Mitigation Plan for after-hours operations.

C. Construction Devices and Activities

- Specific noise mitigation requirements and suggested additional mitigation options are provided for five general categories of particularly noisy construction equipment, including:
 - Impact Devices – i.e., pile drivers, jackhammers, hoe rams, and blasting
 - Earth Moving Equipment – i.e., vacuum excavators
 - Trucks and Vehicles – i.e., dump trucks
 - Stationary Equipment – i.e., cranes, auger drill rigs, street plates, backup alarms
 - Manually Operated Equipment – i.e., concrete saws

D. Perimeter Barriers, Temporary Barriers, and Noise Curtains

- Noise barriers or curtain systems will be required around the perimeter of work sites when working within 200 feet of a receptor. Barriers/curtains must be made of noise-resistant material sufficient to achieve a Sound Transmission Class (STC) rating of STC 30 or greater, break the line-of-sight between the noise source(s) and the receptor(s), and be erected to a height of at least 15 feet tall. Barriers/curtains can be made of any suitable material such as wood, plastic, Plexiglas, concrete, steel or earthen berms. Other materials and designs will be acceptable as well (See Photos 1 and 2).
- Portable 'noise tents' made from noise curtain material attached to three sides and the top of a metal frame will be used to form an enclosure to cover small noisy equipment and/or activities such as jackhammers (See Photos 3 and 4).

**Table 1: NYCDEP Noise Regulation Equipment Noise Criteria
(Taken from FHWA Roadway Construction Noise Model2, RCNM, 2006)**

Equipment Description	Lmax Noise Limit at 50 ft, dBA, slow	Equipment Description	Lmax Noise Limit at 50 ft, dBA, slow
All other equipment > 5 HP	85	-- continued --	-- continued --
Auger Drill Rig	85	Grader	85
Backhoe	80	Horizontal Boring Hydraulic Jack	80
Bar Bender	80	Hydra Break Ram	90
Blasting	94	Impact Pile Driver (diesel or drop)	95
Boring Jack Power Unit	80	Insitu Soil Sampling Rig	84
Chain Saw	85	Jackhammer	85
Clam Shovel	93	Mounted Impact Hammer (hoe ram)	90
Compactor (ground)	80	Paver	85
Compressor (air)	80	Pickup Truck	55
Concrete Batch Plant	83	Pneumatic Tools	85
Concrete Mixer Truck	85	Pumps	77
Concrete Pump	82	Rock Drill	85
Concrete Saw	90	Scraper	85
Crane (mobile or stationary)	85	Slurry Plant	78
Dozer	85	Slurry Trenching Machine	82
Dump Truck	84	Soil Mix Drill Rig	80
Excavator	85	Tractor	84
Flat Bed Truck	84	Vacuum Excavator (vac-truck)	85
Front End Loader	80	Vacuum Street Sweeper	80
Generator (25 KVA or less)	70	Vibratory Concrete Mixer	80
Generator (more than 25 KVA)	82	Vibratory Pile Driver	95
Gradall	85	Welder	73



Photo 1. Plywood Barriers on Jersey Bases



Photo 2. Container Trailers as Noise Barrier



Photo 3. Noise Curtain Material



Photo 4. Noise Tent Enclosure

7. DEPARTMENT SUPPORT

It was not NYCDEP's intent to create unreasonable restrictions or to cause undue burdens for contractors. In fact NYCDEP was very careful to ensure that contractors and their representative groups were included in crafting the new regulations from the very beginning. While not every concern or objection could be resolved to their satisfaction, the NYCDEP did reply to every comment received by these concerned parties. In most cases the Department's replies to the contractors included providing specific examples of how their mitigation concerns had been successfully overcome on other projects nationwide.

One example of NYCDEP's attempts to support contractors involves the use of readily available materials to act as noise barriers. As shown in Photo 5, typical shipping containers (Conex Boxes) were recommended by NYCDEP to a contractor working in the Bronx for use as a noise barrier while building a new water treatment plant. The work involved extensive rock drilling and pile driving. Shipping containers measure 20 feet long x 8 feet deep x 8 feet tall, so a 16 foot tall noise barrier can easily be made by double-stacking the boxes. Gaps between the boxes were filled with noise curtain material similar to the kind seen in Photo 3.

Another example involves NYCDEP's support and encouragement of a contractor to develop a prototype jackhammer muffler, as shown in Photo 6. In this case the muffler, made of a heavy vinyl cylindrical material with a special rubber collar around the bit, was tested by NYCDEP staff and was found to reduce noise emissions from various full-sized jackhammers by as much as 9 decibels. Interestingly, in this case the unmitigated jackhammer would have failed NYCDEP's new noise emission criterion of 85 dBA L_{max} at 50 feet (see Table 1), but would have passed it with use of the new muffler.

Yet another example involves a *Noise Control Product and Vendor Guidance Sheet* which was prepared by NYCDEP to give to contractors to aid them in finding and selecting quieter-type equipment and materials for their job sites. This Guidance Sheet was synthesized from confidential noise emission data provided by multiple equipment manufacturers. Only the noise data that was collected via certified test methods, such as SAE J88 and J1805, EU 88/EC and 14/EC, and ISO Standards 3744, 4872, 6395 and 2151, were used in these comparisons.



Photo 5. Conex Boxes used as Noise Barrier



Photo 6. Prototype Jackhammer Muffler

8. SUMMARY

The new Rule, which amends Title 15 of the Rules of the City of New York (RCNY) by adding a new Chapter 28, establishes the requirement that contractors develop and implement Noise Mitigation Plans prior to performing construction work within the City.

Standards and procedures are established to reduce noise levels from construction, and sound level criteria for specific noise sources are provided. The new Rules prescribe the methods, procedures and technology that shall be used at construction sites to achieve noise mitigation whenever certain construction devices or activities set forth in the Rules are employed or performed.

The specific requirements contained in the new Rule are consistent with the current state-of-the-art with respect to means and methods of construction noise control^{2,3,4}. The Rules will require proactive avoidance of construction noise, as well as allowing NYCDEP to react when necessary for enforcement purposes. Contractors will need to develop and adhere to a site-specific Noise Mitigation Plan, and work cooperatively with nearby noise sensitive receptors. For its part NYCDEP will not only oversee the enforcement of these new Rules, but will work very closely with contractors to ensure that they understand and can comply with the new Rules. NYCDEP's intention is not to unduly hinder contractors, but rather to support them with cost-effective noise mitigation solutions.

With the commencement of this new Rule on July 1st, 2007 it is expected that construction noise levels will be reduced citywide. Over time contractors will purchase quieter equipment and will work in a quieter manner in accordance with their own Noise Mitigation Plans. Noise mitigation measures, such as barriers/curtains and quieter-type backup alarms, will be reused and relocated as needed. Therefore the cost to the contractors to equip themselves with these quieter devices and to adhere to the new noise restrictions is expected to be minimal.

With such easy access to information via the Internet and with all the recent media exposure given to the topic of community noise control and quality of life, it is expected that many other cities nationwide will be watching with interest as New York City implements these new Rules.

9. POST SCRIPT

As of the date this paper is being submitted, the new New York City Noise Code has successfully been in effect for about two weeks now. Media attention has been remarkable; including scores of newspaper articles, television and radio announcements from all over the U.S. and places as far away as Britain, Russia, India and China.

While certainly not proof of its long-term effectiveness, the number of noise complaints to the City's 311 hotline did decrease by about 5% (about 100 fewer calls) during the first weekend that the new regulation went into effect. As stated above, it is expected that many other cities and towns will follow this situation carefully as they consider updating their own noise laws.

The City has posted all pertinent information about the new New York City Noise Code⁵, including details on the Construction Noise Rules, Sample Noise Mitigation Plans, and the Product and Vendor Guidance Sheet on their website which is available at: <http://www.nyc.gov/html/dep/html/airnoise.html>.

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