TORONTO

STAFF REPORT
ACTION REQUIRED

Managing Traffic Disruption on City-Led Construction Projects

Date:	December 16, 2014
To:	Public Works & Infrastructure Committee
From:	Executive Director, Engineering & Construction Services
Wards:	All
Reference Number:	p:\2015\Cluster B\TEC\PW15005 (AFS# 20497)

SUMMARY

The construction of sewers, watermains and roads is disruptive to traffic operations because it typically occupies road lanes. When this work is undertaken on major roads with high volumes of vehicular traffic, cyclists, pedestrians and commercial operations the disruption can be significant.

A series of proposed measures are outlined below and in greater detail in this report with the sole purpose of reducing traffic disruption on City-led construction projects within the municipal right-of-way.

The proposed measures include:

- extending construction working hours to shorten project duration;
- improving public awareness and education about City-led construction projects;
- exploring the use of incentive-based contracts in construction contracts;
- improving work zone management; and
- working to improve the utility locate process with utility companies and the Province of Ontario – Ministry of Consumer Services.

RECOMMENDATIONS

The Executive Director, Engineering & Construction Services recommends that:

1. City Council direct the Executive Director, Engineering & Construction Services, to use an extended construction work hours schedule for City-led construction projects, where appropriate, and after consultation with the local councillor/s, by road type as follows:

   a) 24 hour - 7 days per week for:
      i. Expressways;
      ii. Major roads where the work is not in close proximity to residential neighbourhoods; and
      iii. Major roads where the project would be significantly disruptive to TTC streetcar service.

   b) Overnight work for:
      i. Major roads where the work is not in close proximity to residential neighbourhoods, the project allows the road to remain open and free of work during the day, where overnight work will start at 7:00 p.m. and end at 6:00 a.m. six days per week.

   c) Extended daily work hours for:
      i. Major roads between 6:00 a.m. to 11:00 p.m., Monday to Saturday; and
      ii. Local roads between 7:00 a.m. to 9:00 p.m., Monday to Friday.

2. City Council authorize the Executive Director, Engineering & Construction Services to report back to the Public Works & Infrastructure Committee in the first quarter of 2016, on the outcome of various measures to mitigate traffic disruption implemented for 2015 construction projects, including:
   a) a summary of the net reduction in the duration of construction;
   b) capital cost impacts;
   c) operational issues which may have surfaced;
   d) traffic impact analysis; and
   e) recommendations of schedule options for future construction projects.

3. City Council direct the Executive Director, Engineering & Construction Services, in consultation with the General Manager, Transportation Services, the Director of Purchasing & Material Management and the City Solicitor to report to the Public Works & Infrastructure Committee in the second quarter of 2015 on the construction contract terms and conditions which may provide contractors working within the municipal rights-of-way with incentives to complete projects early and/or additional financial penalties for causing delays in the completion of construction projects.

4. City Council direct the Executive Director, Engineering & Construction Services, the General Manager, Transportation Services, the General Manager, Toronto Water and the Director, Strategic Communications, to develop and implement an integrated public awareness and education program to inform the public about ways in which they can learn about the location and timing of construction and options they can take to minimize the effects of that disruption.

5. City Council direct staff to:
    a) issue a general complaint to the Province of Ontario – Ministry of Consumer Services regarding the non-compliance under the Underground Infrastructure Notification Systems Act by utility companies and the associated protracted delays in securing utility locates for City-led construction projects;
    b) Request the Province to provide information on when/how compliance will be met to assist City staff in mitigating construction-related traffic disruption; and
    c) Communicate to the Province of Ontario a request to mandate that utility companies operating with the City of Toronto form a Locate Alliance Consortia (LAC) wherein a single service provider would be engaged to provide utility locates on behalf of all member utility companies.

Financial Impact

The recommended measures outlined in this report that aim to reduce traffic disruption on City-led construction projects within the municipal right-of-way are anticipated to result in an increase in the capital cost of construction projects, with a cost premium of 20% or greater estimated for the most costly measures.

In consultation with the client divisions, a cost-benefit analysis will be conducted on a project-by-project basis to determine whether the benefits of the measures being considered, specifically the user impact from the mitigated traffic disruption, outweigh the capital cost premium that may be encountered in the delivery of the project.

When the determination is made to proceed with a capital project that will require a cost premium to reduce traffic disruption, existing funds within the approved capital project will be utilized to support the project delivery.

In addition to the capital costs identified, the development of an integrated public awareness and education program to inform the public about City-led construction projects and options to avoid or minimize the disruption caused by construction, is expected to have an impact on the Operating Budgets for Toronto Water and Transportation Services of $200,000 each ($400,000 total) in 2015.

Operating funds for this purpose are available within the base level of funding for both Toronto Water and Transportation Services. In the event additional funds are required staff will seek Council's authority for reallocation of funds through an in-year adjustment report.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

At its meeting on March 19, 2013, the Public Works & Infrastructure Committee received a report from the Acting Executive Director of Engineering & Construction Services titled Managing Construction Disruption. The Council Decision Document can be found at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.PW21.5

The report outlined 12 strategies that Engineering & Construction Services staff employ to minimize construction duration and manage disruption in the delivery of projects. The strategies ranged from process and procurement strategies to construction strategies. The report also identified that the strategies were not applicable to all situations and that each situation was to be carefully considered and public consultation was necessary to determine if the benefit of implementing strategies outweighed the impacts.

At its meeting on November 20, 2013, the Public Works & Infrastructure Committee endorsed a report from the General Manager of Transportation Services titled Congestion Management Plan 2014-2018. The Council Decision Document associated with this report can be found at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.PW27.12

The report provided a comprehensive five-year Congestion Management Plan to address congestion in the City. The Plan provided a framework for a range of projects and activities that addressed a series of technical elements, including but not exclusive to, Intelligent Transportation Systems, Incident and Event Response, Construction Coordination and Traffic Operations Centre.

ISSUE BACKGROUND

The City of Toronto, through the Major Capital Infrastructure Coordination Office, coordinates construction within the City's road right-of-way, with the participation of City divisions, TTC, utility companies and other third-party agencies, to ensure that construction is planned and sequenced in a manner that will minimize disruption to the public.

This report builds on those coordination efforts by proposing a series of measures to take during construction, with the objective of reducing traffic disruption on City-led construction projects within the road right-of-way.

Traffic congestion in the City of Toronto is a major concern for road users and public officials charged with managing the City's transportation road network. Congestion and disruption caused by public and private construction has been particularly problematic in the downtown core, where there has been an increased number and duration of lane restrictions supporting the construction of: commercial and residential projects; significant infrastructure projects such as the Union Station Second Platform; rehabilitation of the Gardiner Expressway; replacement of aging sewers and watermains; replacement of TTC tracks; road reconstruction projects; and the work of numerous public utilities and telecommunication companies that occupy portions of the City's right-of-way.

The City is making great strides in addressing its sewer, water and roads infrastructure renewal backlog, with a forecasted growth in capital construction in the next 10 years, raising the prospect of higher construction-related impacts on pedestrians, cyclists, transit and motorists.

COMMENTS

In 2015, The City of Toronto plans to deliver capital construction projects within the municipal right of way, valued at over $530 million. Engineering & Construction Services is expected to deliver an estimated 500 projects valued at approximately $350 million. An estimated 85 construction projects are "planned" within the major road network. These projects include the rehabilitation of bridges and the Gardiner Expressway, local and major road rehabilitation, sewer and watermain projects for Toronto Water including upgrades to sewer infrastructure supporting the City's the Basement Flooding Protection Program. While the investment in the renewal of the City's infrastructure will help address the City's significant infrastructure renewal backlog, and provide longer term benefits, the construction activities will unfortunately have a negative impact in the short term.

It is important to note that that there are many other construction activities by third parties within the municipal rights of way that also impact the flow of traffic such as utility cuts for service repairs or new installations, and lanes closures to support land development projects. The City issues more than 60,000 permits to various parties to conduct utility cuts within the road rights-of-way annually. Approximately 50 per cent of these permits are issued to third party utility companies. On average, there are more than 10 utility cut permits issued per kilometre of road per year, and there are approximately 150 utility cuts occurring each day at various locations across the City. Annually, the City issues 5,000 street occupation permits for lane closures to support land development projects. In addition to third-party construction activities, there are more than 500 street events, 300 demonstrations and many parades on City streets.

In light of the above, a number of measures are being proposed to help reduce the traffic impacts of City-led construction projects.

Public Awareness and Education

The development of an integrated public awareness and education program is being proposed that will build credibility and confidence in the City's efforts to:

- coordinate projects and minimize the impact of construction;
- inform residents of the need for infrastructure renewal and its complexities;
- create information for various audiences including the need for behaviour change on the part of drivers, cyclists and pedestrians;
- implement tactics to inform multiple audiences; and
- define measures of success and analyze the effectiveness of the campaign.

The public education campaign will include tactics such as advertising, media relations, social media, app development, an enhanced website, etc. The development of the strategy will also assess the most effective means of notifying the travelling public about new and pending construction projects, and suggestions to reduce travel times and/or alternate routes.

Informing and educating the public are key to the success of any City of Toronto initiative. One of the main purposes of this public awareness campaign is to persuade people to accept new ideas and change existing attitudes and behaviours leading to the public considering changes in their travel decisions.

When it comes to communicating about construction and congestion, and their impact on travelling around the City, the communications objectives are less about behaviour change and more about understanding and accepting, and building credibility and confidence in the City's ability to deliver construction work and manage congestion. The message to be conveyed is that the City is taking effective and responsible action to minimize the impact of construction and to coordinate the myriad of infrastructure projects taking place in the City. Infrastructure and construction projects, while inconvenient in the short term, will ultimately ensure the longevity of the City's infrastructure and enhance the quality of life for residents.

The effort to tell the story of construction coordination and traffic impact mitigation is complex. There are a number of people involved in challenging construction projects. It will be important for communications on this issue to weave the more complex information among the quick hits and tips so audiences come to appreciate the deeper story while making use of more public-friendly and timely notifications.

In the interim, the following measures are being implemented to help advance an improved communications and public education strategy:

a) Media and Social Media Notifications

Regular media releases are issued to inform the public about work on roads that will result in potential disruptions. Bi-weekly news releases will be issued, when appropriate, about work on major roads. Project information will be sent to Councillors for posting on their websites or in newsletters and increased use of the City's twitter feed to highlight road restrictions.

b) Improved Construction Signage

It can be difficult to provide every project detail including type of work, degree of impact and expected project duration through signage.

Currently, there are four types of signs used around construction sites for City capital works:

i. Orange and black traffic directional signs to help in guide traffic around work zones and adhere to MTO regulations (Book 7);
ii. Variable message signs placed in advance of projects on major roads or well-travelled routes to advise the public of work underway;
iii. Orange and black advisory signs located ahead of projects to inform the public of expected delays, the work happening, its location and project duration; and
iv. Branded blue and white City of Toronto capital work (construction notification) signs placed in areas outside the work zone.

In 2015, the orange and black traffic directional and advisory signs will continue to be used as required to provide safe notification of work and traffic flow around the construction site; however, there will be changes to the uses of the standard City of Toronto capital works signs to help better inform the public of the construction activity. The following changes are proposed:

1) Revising the sign dimensions, material and content.
2) Moving the signage into the work zone so the public is informed directly of the work underway at the site (i.e. in the past, the signs were generally located in advance of the construction site, and therefore challenging the public to remember what work was taking place and where, by the time they reach the work zone).
3) Providing information the public needs to know. Currently the standard notification signs provide a project title for the work taking place, the expected project schedule and contract number, but this information will be augmented, where appropriate, with a short explanation of the work underway.
4) Using fence / mesh banners. The current capital work signs are wood, on stands or posts and in two sizes. The new work zone signs will be produced on mesh banners in appropriate sizes for each project. They are easier for contractors to install (can be tied to fencing used in work zones) and provide important information where the public can make the connection to the work taking place.
5) Using more variable message signs with Bluetooth technology in advance of work zones to inform vehicular traffic of travel times through work zones in real-time so drivers can make alternate-route decisions.

c) Construction Notifications

Improve Construction Notifications so the information provided, timing and delivery is consistent for all major capital construction projects. The process for staff and contractors around notice delivery will be refined and improved.

Construction Work Hours

It is proposed that, where appropriate, construction schedules be set to minimize traffic impacts which could include:

a) extended daily work hours;
b) overnight work; and
c) work 24 hours per day - 7 days per week.

A detailed explanation of these options is outlined below.

a) Extended Daily Work Hours

Contracts for linear capital projects typically permit construction activity between the hours of 7:00 a.m. to 7:00 p.m., Monday to Friday, and 9:00 a.m. to 7:00 p.m. on Saturday in accordance with the restrictions outlined in Chapter 591 – Noise of the Toronto Municipal Code.

During Daylight Savings Time, the longer daylight conditions allow for construction activities to begin before 7:00 a.m. and continue beyond 7:00 p.m. Extending the working day to start at 6:00 a.m. and end at 11:00 p.m. will permit the contractor to expedite their construction activities and complete the project sooner than has been typically possible.

Example:

Engineering & Construction Services already use extended work hours of 7:00 a.m. to 11:00 p.m. for TTC track replacement projects. Extending work hours on these projects enables work to be completed an estimated 30 per cent sooner than projects which normally end at 7:00 p.m.

There may be opportunities to implement extended hours of operation for construction work within major road projects, planned for 2015. However, the construction industry has also identified significant challenges with incorporating an extended working hour schedule, such as the availability of:

- skilled labour and resources due to Canadian Labour Law regulations; and
- materials and supplies after regular business hours.

The implementation of extended hours of operation may result in an increase in the capital cost of the projects depending on the project size, location and complexity.

b) Overnight Work Hours

There are certain projects on major roads that provide an opportunity for the contactor to conduct their construction activities overnight. This option will reduce or eliminate traffic impacts during peak commuting periods. Overnight construction activity would only be permitted between the hours of 7:00 p.m. and 6:00 a.m. Through lanes must be re-opened for traffic during the day.

Example:
In 2014, Engineering & Construction Services initiated an overnight project to investigate opportunities to reduce traffic disruption: the Finch Avenue West Major Road Resurfacing Project. The project extended from Highway 400 in the west to Dufferin Street in the east, and excluded the section between Romfield Drive and Tangiers Road. The project also involved replacing large diameter commercial and industrial water services and sidewalks. The traffic restrictions for this project required the contractor to ensure that one lane of traffic in each direction was maintained during the overnight period and that all through lanes were re-opened every morning by 6:00 a.m. The contractor was also required to make every effort to mitigate noise impacts for the neighbouring residential areas.

Engineering & Construction Services staff gained valuable insights on the challenges and resource requirements for overnight projects:

- Appropriate consultation with the construction industry will benefit the planning for overnight projects;
- Early consultation with the local Councillor is necessary and, where directed by the Councillor, local residents;
- An overnight project requires additional inspectors on site compared to a daytime project;
- Contractors have limited access to materials (i.e. concrete and asphalt plants would have to extend their hours of operation and a cost premium is expected as a result, which could result in cost escalations) and equipment on an emergency basis; and
- Detailed planning by the contractor is required to ensure the lanes are re-opened in a manner safe to traffic, especially TTC vehicles.

Implementing the overnight construction schedule for this project resulted in an estimated 15 per cent increase in the capital cost for the project.

c) Working 24 hours per day - 7 days per week (24/7)
There are certain locations and projects on expressways and on major roadways, where the user impact associated with traffic restrictions is extremely high, where an accelerated 24 hour construction schedule is warranted. In these cases, the construction would be undertaken at an accelerated pace and as a continuous operation.

There are significant challenges with using a 24-hour construction operation, such as:

- maintaining allowable noise levels for neighbouring residents;
- the availability of skilled labour and resources due to Canadian Labour Law regulations; and
- the availability of material and equipment suppliers in overnight hours (i.e. concrete and asphalt plants would have to extend their hours of operation

and a cost premium is expected as a result, which limit competition and could result in substantial cost escalations).

The implementation of a 24/7 construction operation could result in a 30 to 50 per cent increase in the capital cost of the project depending on the duration, project size, location and complexity.

Example:
Engineering & Construction Services working with the TTC have already used a 24/7 schedule for track replacement projects at major intersections. These extended work hours allow the contractor to pour concrete during the day and the street car rail to be installed overnight by the TTC. Working in tandem, these efforts reduce the need for full intersection closures by 14 days compared to the 28 days needed if work was not scheduled 24/7.

d) Scheduling of Projects to the Lower Traffic Periods in the Summer

City roadways typically experience lower traffic volumes during the months of July and August and any construction activity undertaken within these months tends to be less disruptive to motorists. However, it should be noted that most construction contracts have a construction schedule greater than two months and as a result only short term duration projects would be considered for this measure. Projects involving TTC track replacement work is usually scheduled for this time of year because buses are available to replace streetcars when rider volumes are lower.

Further, a majority of cultural and sporting events occupying the City's road rights-of-way are typically also scheduled during the summer months, particularly in the downtown core where there are limited off-road sites to conduct these events. Staff will undertake a review of those projects which could be directed to this summer.

In 2015, there are an estimated 85 construction projects planned on major roads. The appropriate scheduling options will be evaluated by staff on a project-by-project basis using a comprehensive review of the project details and criteria to ensure that the best option is selected, in consultation with the affected Ward Councillor/s.

Staff will report back to the Public Works & Infrastructure Committee in the first quarter of 2016 on the outcome of using the above-noted approaches, including a summary of the net reduction in construction work day schedule, capital cost impacts, operational issues which may have surfaced, analysis with respect to traffic impacts and recommendations on the applicability of the various schedule options for future construction projects.

Work Zone Performance Management and Monitoring

Lane occupations, whether related to development activity, utility work or Capital works projects contribute significantly to congestion throughout the city. This impact is, of course, most pronounced in the downtown core. In the past, construction staging permits were not routinely issued. Individual permits were issued on a daily basis for temporary occupations of the lane (i.e. for loading and unloading) and Police were often used to stop pedestrians on the sidewalk (and the entire roadway) for concrete pouring or to hoist materials to the site. However, the use of construction staging areas within the road allowance has allowed contractors to keep a pedestrian walkway open at all times, which also means that traffic may continue to pass by as materials are hoisted.

The Downtown Transportation Operations Study (DTOS) identified a number of measures that have been implemented to mitigate congestion. An additional measure that is being considered involves developing an approach to better manage the impacts of lane occupations. The concept includes having applicants prepare a construction management plan to mitigate the traffic impacts as part of the Site Protection or Street Occupancy approval process.

Major construction projects typically have a disruptive influence on traffic conditions in the area. In road construction zones across the City there are occasions where one or more traffic lanes are occupied as part of the construction project. Undertaking road construction, especially in the downtown core, typically results in the road being used to store construction material. Additionally, some work zone requirements dictate that areas outside of the immediate construction area protect the site and are not used by traffic.

To minimize these traffic impacts, Engineering & Construction Services staff in consultation with Transportation Services, are performing an analysis of the existing traffic conditions in the area for the road network. Strategies will be employed and may include network changes in signal timing, limiting lane closures etc. These accepted strategies are implemented in construction staging and traffic management requirements for the project and form part of the tender submission identifying the traffic restrictions that the contractor must consider as part of their proposed work activities.

Some typical components identified in the construction staging and traffic management requirements for various construction projects include:

- signed detour routes;
- authorized lane closures;
- possible lane shifting;
- permitted work hours;
- authorized material and equipment storage areas;
- traffic control signal timing modification on the construction route and nearby adjacent routes; and
- local and through traffic restrictions.

Further, and key to the success of this strategy, is on-going monitoring and enforcement of contractor compliance with the traffic management requirements in a contract.

Engineering & Construction Services project management staff and Transportation Services by-law enforcement staff will continue to cooperate in this effort. Transportation Services may require additional staff resources in the development of traffic management requirements and enforcement of construction project sites.

Smart Construction Work Zones

Traffic cameras (CCTV cameras) are typically installed by Transportation Services staff to monitor the ongoing traffic conditions on expressways to ensure traffic flow on these routes is maintained at all times and that any impediments are mitigated as soon as possible. The City's Traffic Management Centre is continuously monitoring traffic conditions from a number of remote camera monitors typically installed atop traffic signal posts. The information obtained from these cameras help staff use measures to mitigate the traffic congestion by either adjusting the signal timing or contacting the appropriate resources (e.g. emergency personnel, tow trucks) to relieve the source of the congestion.

Engineering & Construction Services and Transportation Services staff are investigating opportunities to have portable traffic cameras installed at appropriate work zone locations, and the City's major road projects, subject to the availability of staff resources to monitor these additional camera locations.

Incentive-Based Contracts (Incentive/Penalty Clauses)

Currently, the City's applies liquidated damages as a daily amount payable by the contactor to the City for every day the contractor is late in meeting the contract deadline. The per-day liquidated damages amount is set by the City's project manager and entered into the contract on a project-by-project basis.

Liquidated damages include amounts intended to cover the cost of additional staff time, the City consultant's time spent managing the project where applicable, and additional charges that may be levied by third parties like utilities and railways in the event of a delay. If a contractor is late, accumulated liquidated damages amounts are retained from amounts otherwise payable to the contractor for their work for every day that a contractor is late.

Liquidated damages are imposed when a contractor is late. Currently, however, there is no financial incentive for contractors to accelerate construction work, complete the project ahead of schedule, and help reduce traffic congestion.

Transportation Services is currently reviewing lane occupancy fees. It is recommended that review of the use of incentive and penalty clauses be developed in conjunction with the development of lane occupancy fees. This would ensure an integrated approach to managing lane occupancy and contractor incentives to reduce traffic congestion.

A staff working group will review incentive based contract models used by other municipalities, the Province and public agencies to determine their experience, risks and mitigation measures. Engineering & Construction Services staff in consultation with

Transportation Services, Legal Services and Purchasing & Materials Management will report back to the Public Works & Infrastructure Committee in the second quarter of 2015, on recommendations for inclusion of incentive and penalty provisions in City construction contract documents for acceleration or delays, respectively, for construction projects within the municipal right of way.

Delays Caused by Provincial Regulations to Locate Underground Infrastructure (Ontario One Call)

Provincial legislation requires all constructors to locate underground infrastructure prior to starting excavation within the road right-of-way or on private property. In June 2012, Bill 8, the Ontario Infrastructure Notification Systems Act, came into force requiring all municipalities and owners of underground infrastructure to become members of the Provincial agency known as Ontario One Call (ON1Call). ON1Call was established as a call centre to dispatch utility location requests from the public and construction industry to utility owners. The Ontario Infrastructure Notification Systems Act requires utility owners or their respective locate service providers (LSP) to provide locates within five days of a request being made to ON1Call.

In 2014, capital construction projects within the City's road right-of-way experienced significant schedule delays; in large part attributed to contractors being unable to secure utility locates in a timely manner. This situation is attributed to the exponential increase in the volume of locates required by Provincial legislation and ON1Call regulations, the extent and pace of public and private construction activity in Toronto, and other inefficiencies in the ON1Call system.

Engineering & Construction Services staff and the Major Capital Infrastructure Coordination Office convened several meetings with ON1Call staff in 2014 to express the concerns noted above, and recommend changes in regulations and procedures. In particular, City staff advised ON1Call that utility locates were adversely impacting the cost and timing of a significant number of construction contracts within the City's road right-of-way. Delays in completing contracts as planned result in construction cost escalations and an increased disruption experienced by the public because contracts take longer to complete and decrease the quality of work as projects extend into less favourable weather conditions. Extending construction schedules also affect the start and end dates of coordinated capital projects which, in turn, have an adverse cascading impact on seasonally or time constrained projects that already have a narrow construction window (i.e. projects that involve hot mix asphalt paving and large quantities of exposed concrete work).

ON1Call is in the process of establishing a committee that will provide compliance oversight with the requirements outlined in the Act. However, the City was informed by ON1Call that based on the anticipated continued high volume of construction activities in 2015 and associated utility locate requests, the average number of days for securing field locates will likely remain unchanged in 2015.

In response, Toronto Water and Transportation Services staff are exploring the formation of a Locate Alliance Consortia (LAC) with utility companies in the Toronto area, wherein locates would be provided by a single locate service provider on behalf of all LAC members. This would serve to improve efficiencies in the provision of locates, improve timeliness and reduce overall costs for the utility owners and the City. In this approach, one company would be called upon to provide locates on behalf of the member utilities for a given construction project, rather than dispatching individual locate providers for each utility, at the same project site.

The General Managers of Toronto Water and Transportation Services, the Director of Purchasing & Materials Management, Executive Director of Municipal Licensing & Standards, and City Solicitor have been consulted on and concur with the strategies outlined in this report.

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