★ planning advisory service

AMERICAN SOCIETY OF PLANNING OFFICIALS
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LAND DEVELOPMENT ORDINANCES*

GRADING; CURB CUTS AND DRIVEWAYS; STREET TREES

Municipal planning agencies are frequently called upon to study problems that are outside the traditional boundaries of land use planning. In cities that have no municipal research bureau, the planning agency may be better equipped than any other governmental department to conduct research necessary to develop satisfactory regulations. Even where governmental research bureaus are available, the planning agency has often acquired a reputation for furnishing reliable information on subjects not ordinarily considered "planning." In its work of evaluating local conditions and preparing long-range plans, the planning agency is continually forced to recognize regulatory problems of an immediate rather than a long-term nature.

Ordinances are prepared specifically to limit the undesirable effects of filling stations, drive-in theaters, signs and billboards, and many other uses. Customarily these ordinances, adopted under specific statutory authority or under the police power granted to cities by the states, are intended to cover all aspects of the problem that need regulation.

Municipal regulatory ordinances usually include at least the following provisions:

Title -- gives formal name of ordinance and often a short name;

Statements of purpose and scope -- gives reasons for the regulation, which aspects of a use are regulated, and the areas of the community in which the regulations are to apply;

Designation of an administrator -- delegates to a public official, by title, the powers necessary to administer and enforce the ordinance;

Requirements for permits -- sets the conditions under which regulated acts may be performed and establishes fees and time limitations;

Standards -- designates the quality of performance demanded or delegates to the administrator the power to prepare such standards;

Administrative provisions -- establishes requirements for hearings, appeals, amendments, publication, separability of provisions, etc.

Violations and penalties -- states what acts constitute violations of the ordinance and sets fines or jail sentences.

This bare outline is subject to the many variations demanded by local practices and statutory requirements on the form and content of ordinances.

Zoning vs. Special Regulation

In recently passed zoning ordinances there appears to be a tendency to include many subjects ordinarily covered by special regulatory ordinances. Often the new provisions have a direct bearing upon the regulation of the use of land in different zones of the city. As such they may represent a legitimate expansion of the scope of zoning. In other cases, however, the relation to land use control seems farfetched.

Zoning today is so well accepted by the courts that there is probably a temptation to incorporate regulations that might otherwise be of questionable legality or outside the statutory authority of the city. The zoning ordinance may also be a convenient place to impose controls that might arouse public opposition. An amendment to the zoning ordinance text will probably receive less attention from the public than will a new regulatory ordinance. It may also be easier to justify regulations placed in the context of zoning than if such regulations are forced to stand on their own merits.

The result is that zoning ordinances are in danger of becoming catchalls for regulations that have little direct relation to land use planning. Many of the new regulations require the approval of not only the building inspector but also of the planning commission. If the trend toward planning commission approvals continues and additional regulations are placed in the zoning ordi-

nance, planning agencies will soon find they have no time left to devote to their primary function -- the preparation of long-range plans to guide the development of the community.

Below are criteria for determining when a proposed regulation may better be accomplished through a special ordinance than through a zoning ordinance. While these criteria are not always absent from all zoning controls, if the solution to a problem seems to call for citywide application, licensing, periodic inspection, and so on, the special ordinance is probably the appropriate method of control.

1. When uniform regulation is desired throughout the city. An important characteristic of zoning is that different regulations may be applied in different districts, subject, of course, to statutory provisions that the same regulations apply to similar uses under similar conditions.

2. When the districts established for different types of regulation do not coincide with the boundaries of zoning districts. Districts designed for land use control are not always appropriate to other forms of regulation. Fire districts as designated in building codes and fire ordinances are typical examples of districts with boundaries that do not necessarily coincide with the boundaries of districts established in the zoning ordinance.

3. When the regulations must apply to existing as well as new uses to assure effective regulation. Traditionally, zoning controls have applied only to new uses or to a change of use. Even if the zoning ordinance provides for the elimination of nonconforming uses or their eventual compliance with the ordinance provisions, a considerable amount of time will elapse before the zoning regulations become effective in handling existing uses.

4. When periodic inspection is required. Both zoning and subdivision regulations provide only for initial review and inspection of new structures or developments. After the building permit and certificate of occupancy are issued, there is seldom an effective method for continuing inspection and regulation, nor is periodic inspection normally considered necessary.

5. When permits, licenses, or performance bonds are needed to assure continued compliance. Usually zoning and subdivision controls make no provision for the issuance of special permits or licenses, nor for annual renewal.

6. When officials other than the building inspector or the zoning board of appeals are best equipped to administer the regulations. Building inspectors probably have a full-time job administering the building code, zoning ordinance, and other regulations. Often another governmental department or official can better handle a special regulation.

7. When the regulations are to prevent misuse of or encroachment on public property. Zoning and subdivision regulations are almost always framed to apply only to privately owned land.

These criteria also generally apply to regulations that might be incorporated into other municipal regulations, such as building and housing codes and subdivision regulations.

There are many different problems that may be handled through special ordinances at least as well as through zoning or subdivision regulations. Certain aspects of regulation may best be handled through general ordinances; others more appropriately through zoning ordinances.

Below are some of the subjects of governmental regulation in zoning ordinances that might be more appropriate subjects of special ordinances:

Gasoline filling stations and repair garages
Off-street parking and loading
Signs and billboards
Trailer camps and motels
Private swimming pools
Storage of explosives and petroleum products
Smoke and noise
Air pollution
Drive-in theaters
Preservation of trees on private property
Architecture
Junk yards
Moving of buildings
Underground structures
Building lines
Airports
Radio and television antennas
Location of liquor stores

This report deals with regulatory ordinances for three subjects related to land development: (1) excavations and fills on private property, sometimes handled in subdivision regulations or building codes, and occasionally zoning ordinances; (2) curb cuts and driveways, often regulated by zoning; and (3) street trees, which are almost always regulated by special ordinance, rather than through zoning or subdivision regulations. The purpose of this report is twofold: to show the types of provisions that may be enacted under special ordinances and to summarize methods now in use to control three problems related to physical planning.

GRADING

Cities usually have regulations controlling or prohibiting excavations in streets and other public properties to prevent indiscriminate damage to pavements, planting strips, and road shoulders. Less common are ordinances regulating excavations and fills on private property. Yet under many conditions, particularly in rough terrain, such regulations are needed to prevent property damage caused by storm water run-off from improperly graded lands.

In January 1955, the Michigan Municipal League (205 South State Street, Ann Arbor, Michigan) published "An Analysis of Ordinances Concerning Excavations in Streets, Alleys, and Other Public Places" (Ordinance Analysis No. 12, 37 pp., mimeo. $1). Even though this publication analyzes only ordinances from Michigan cities, the information has general application throughout the country. Rather than duplicate the work done by the Michigan league, this report will be concerned only with ordinances intended to regulate grading on private property.

An experience in Los Angeles is an excellent example of conditions that led to the establishment of regulations for private grading. An article by Hanley A. Wayne, assistant chief of the building division of Los Angeles' Department of Building and Safety, titled "Excavation and Fill Ordinance Protects Public" (Building Standards, January 1954, pp. 6-10, 15) recounts the experiences of the city when it was struck by torrential rain storms in January 1952. Damage from the storms was estimated at $8 million, much of it caused by construction in natural watercourses and washouts from improperly compacted fills. Mountains and hills had been ruthlessly cut, and the removal of ground cover contributed to the run-off of storm waters. Property owners demanded that the city undertake the regulation of grading so that recurrences of run-off damage might be avoided.

To guarantee that future cuts and fills conform with accepted engineering practices, the Los Angeles City Council in September 1952 adopted regulations covering excavations and fills as an amendment to the city's building code. In late 1953, the neighboring city of Pasadena adopted a "Cut and Fill Ordinance," containing requirements similar to those enacted in Los Angeles. These ordinances are examples of a new type of regulation that may be applicable in other areas of the country.

Elements of Grading Regulations

Both the Los Angeles and Pasadena ordinances provide for the regulation of grading by requiring that permits be obtained for certain types of grading be-

fore work is commenced. These ordinances designate an administrative agency (the department of building and safety in each city); establish standards for the issuance of permits; require inspection of grading operations to see that they are carried out according to specifications; and provide penalties for violations.

The provisions of both ordinances are so similar that, except for a few differences, they may be analyzed together. Where important differences occur, they are noted.

Statements of Purpose. Each ordinance contains a statement of purpose. In the Pasadena law, the statement is as follows:

> The purpose of this ordinance is to provide minimum standards to safeguard life and limb, protect property and promote public welfare by regulating and controlling the design, construction, quality of materials, use, location and maintenance of grading, excavation and fill within the City of Pasadena.

Minor variations in wording appear in the Los Angeles ordinance, which also includes some building code amendments that are not related to the regulation of grading.

Scope of Regulation. These ordinances provide for the regulation of new grading, as well as the maintenance and improvement of existing excavations and fills. The Pasadena ordinance says:

> New grading, excavations and fills, or changes, additions, repairs or alterations made to existing excavations and fills within the city shall conform to the provisions of this ordinance, unless specifically exempted under Subsection (c) of this Section.

Specifically exempted by Subsection (c) are:

> 1. Work in a public street, sidewalk, alley or other public property, unless such work affects the support of structures or buildings regulated by the Pasadena Building Code.
>
> 2. The mining, quarrying, excavating, processing, or stockpiling of rock, sand, aggregate or clay, unless such work affects the support of adjacent or contiguous property or structures.
>
> 3. The depositing of rubbish or other material at any dump operated by the City of Pasadena.

4. An excavation or fill in connection with the making of an earth fill dam regulated by the Division of Water Resources of the State Division of Public Works.

The Los Angeles ordinance exempts, in addition, excavations and fills in cemeteries when they do not affect properties other than those of the cemetery owner and "grading in an isolated, self-contained area if the Board [of Public Works] finds that by reason of such isolation or self-containment no danger to private or public property can now or thereafter result from grading operations."

The Los Angeles provision requiring the maintenance of existing drainage structures and protective devices is as follows:

> Maintenance of Protective Devices. The owner of any property in hillside areas on which an excavation or fill has been made pursuant to a permit granted under Division 2 of this Code, or any other person or agent in control of such property, shall maintain in good condition and repair all retaining walls, cribbing, drainage structures and other protective devices shown in the approved plans and specifications submitted with the application for a permit.

Permits. The Pasadena ordinance requires grading permits for specified types of grading operations anywhere within the city. But in Los Angeles permits are required only in "hillside areas" designated on a map included as a part of the ordinance. Several types of grading operations do not, however, require permits:

1. An excavation that does not exceed five feet (three in Pasadena) in vertical depth at its deepest point. (Fills made with material from excavation require permits.)

2. A fill using less than five cubic yards of material (ten in Pasadena) or that does not exceed three feet in vertical depth at its deepest point and that has no slope at any point steeper than five horizontal to one vertical.

3. An excavation below finished grade for basements and footings of a building, swimming pool, or underground structure authorized by a valid building permit. (Fills made with the material excavated require permits.)

4. An excavation in land having a slope no steeper than five horizontal to one vertical that is back-filled to the original

contours of the land. (This provision does not appear in the Pasadena ordinance.)

Separate permits are required for each site in which an excavation or fill is to be made, but the same permit can apply to both cuts and fills on one site.

Permit Fees. Fees for grading permits required by these ordinances are reproduced in the following table.

Volume of material (in cubic yards)	Permit fees	
	Los Angeles	Pasadena
Not more than 50	- - -	$2.00
50 - 250	- - -	4.00
250 - 500	- - -	8.00
500 or less	$8.00	- - -
500 - 1,000	10.00	10.00
More than 1,000	$10.00 plus $3.00 for each additional 1,000 cubic yards or portion thereof	

In Los Angeles, "the fee for a grading permit authorizing additional work to that under a valid permit shall be the difference between the fee paid for the original permit and the fee shown for the entire project."

The Pasadena ordinance provides for the refund of part of the fees paid by a permittee if the grading work is not carried out or where no work has been done. The refund may not exceed 90 per cent of the permit fee, provided that if the superintendent of building reports that the costs incidental to issuing the permit exceed 10 per cent of the permit fee, the excess shall be deducted from the amount that would otherwise be refunded.

The Los Angeles ordinance exempts from the payment of permit fees any operation that qualifies as a "supervised grading project" conducted under the following procedures:

Supervised Grading. To qualify for exemptions from fees, a supervised grading project shall be conducted under the following procedure:

1. The applicant for a permit shall furnish a contour map showing the areas to be filled and excavated, the original topography and the finished surface. As the work progresses the final surface elevations may vary from the contour map provided no violation of this Code is created thereby.

2. The application shall state the unit foundation bearing values desired.

3. The application shall describe the materials to be used in the fill.

4. The application shall outline the procedure for deposit and compaction of the fill, including the preparation of ground surface before making the fill.

5. The applicant shall file with the Department a report by the approved soil testing agency describing the type of material actually used in the fill, together with a tabulation of the per cent compaction obtained in their various tests and a plan map showing the location of the tests.

6. Upon the completion of the project and before a grading certificate may be issued, the approved soil testing agency shall certify that the project was done in conformity with the Code and with a final contour map to be filed with the certificate. The agency shall also certify to the soil bearing capacity of the fill if buildings are to be supported thereon.

Pasadena also provides for supervision of grading by a licensed civil engineer rather than by city officials, but such supervision does not exempt the property owner from the permit fees.

Validity of Permits. Grading permits are valid for one year, but each ordinance provides for the invalidation of the permit if work is not started soon after the issuance of the permit: in Los Angeles, 90 days; in Pasadena, 180 days. "Reasonable" extensions are permitted to allow the completion of grading if the permittee can show that he has encountered unusual difficulties in completing his operation. Permits on which work has commenced but is not completed may be extended so long as the application for extension is made within 30 days after the expiration date of the permit.

Denial of Permits. The administrative official is given a certain amount of discretion in refusing permits. This is the Los Angeles provision:

> Denial of Permit Where Dangerous Conditions Would Be Created. No permit authorizing an excavation or fill shall be issued by the Board in any case where the Board finds that the work, as proposed by the applicant, is likely to endanger any property or public way. Factors to be considered by the Board in making its findings shall include, but shall not be limited to, possible saturation by rains, earth movements, run-off of surface waters, and sub-surface conditions such as the stratification and faulting of rock, nature and type of soil or rock.

The Pasadena ordinance includes a similar provision, but also adds the following provision intended to release the city from liability in the case of an error by the administrator:

> Failure of the Superintendent of Building to observe or recognize hazardous conditions or to fail to deny the grading permit shall not relieve the owner or his agent for responsibility for the condition or damages resulting therefrom, and shall not result in the City of Pasadena, its officers or agents, being responsible for the conditions or damages resulting therefrom.

Submission of Grading Plans. The applicant for a grading permit is required to submit proposed grading plans containing the following information: a contour map showing present and proposed contours; a plot plan showing the location of grading on the site; a description of soil type, classification, and other special features; detailed plans of drainage, retaining walls, cribbing, surface protection devices, etc.; the name of the person responsible for the grading; and other information deemed essential by the administrator. The superintendent of building may waive all requirements for plans and specifications if the information in the permit application is sufficient to indicate that the grading will meet all ordinance requirements.

Both ordinances require that two copies of sets of plans and specifications be submitted, except that in areas of Los Angeles where the project supervision will be handled by a branch office of the Department of Buildings and Safety, three copies are required. Plans and specifications become public records and are retained for at least three months in Los Angeles (90 days in Pasadena). Plans for large or particularly important projects may be retained permanently.

Inspection of Grading. The permittee is required to report to the superintendent of building at three or four different times during grading operations so

that the superintendent may see that all work is being conducted according to the plans and specifications submitted in the permit application:

1. Initial inspection. When the permittee or his agent is ready to begin work on an excavation or fill. Notification shall be given to the Department of Building no less than two days before any grading is started.

2. Rough grading. When all rough grading has been completed.

3. Special structures. When excavations are complete for retaining and crib walls and when reinforcing steel is in place and before concrete is poured.

4. Final inspection. When all work, including installation of all drainage and other structures, has been completed.

This requirement is from the Pasadena ordinance. The Los Angeles regulations omit the third inspection.

Grading Certificates. After all grading work has been completed in accordance with the ordinance and following the proposed grading plan and specifications, the superintendent of building shall issue a grading certificate indicating that all work has been properly completed. The certificate may also be issued even though the work has not proceeded entirely according to the submitted plans so long as the work complies with ordinance requirements. The grading certificate is similar in effect to the certificate of occupancy issued under the building code or zoning ordinance.

Appeals. The Pasadena ordinance provides that appeals may be taken to the board of appeals established under the city building code. The board may make determinations of alternate methods, standards, or materials when in its opinion strict compliance with the provisions of the grading ordinance is unnecessary.

Violations and Penalties. The Pasadena ordinance provides:

> Any person, firm or corporation violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor and each such person shall be deemed guilty of a separate offense for each and every day or portion thereof during which any violation of any of the provisions of this ordinance is committed, continued or permitted, and upon conviction of any such violation such person shall be punishable by a fine of not more than $500, or by imprisonment for not more than 180 days or by both such fine and imprisonment.

Grading Standards

The grading ordinances are examples of two different methods of establishing design standards: the Pasadena ordinance establishes detailed standards for excavations; the Los Angeles ordinance provides general standards and leaves to the administrator the responsibility for preparing details.

Excavations. Both ordinances state the general rule that no excavation shall have a slope steeper than a ratio of one horizontal to one vertical. The administrator may make exceptions to this rule provided that an engineering study shows that the proposed deviation will not endanger any property. Under adverse soil or drainage conditions a flatter slope may be required. Steeper slopes are permitted under the following conditions by the Pasadena ordinance:

1. The excavation is located so that a line having a slope of one horizontal to one vertical and passing through any portion of the cut face will lie entirely inside the property lines of the property on which said excavation is made.

2. The material in which the excavation is made is sufficiently stable to sustain a slope of steeper than one horizontal to one vertical, and a written statement of a Civil Engineer, licensed by the State of California and experienced in erosion control, to that effect is submitted and approved. The statement shall state that the site has been inspected and that the deviation from the slope specified above will not result in property damage.

3. A retaining wall or other approved support is provided to support the face of the excavation.

The superintendent of building may require an excavation to be made with a cut face flatter in slope than one horizontal to one vertical, if he finds the material in which the excavation is to be made unusually subject to erosion, or if other conditions make such flatter cut slope necessary for stability and safety.

Excavations shall not extend below the angle of repose or natural slope of the soil under the nearest point of any footing or foundation of any building or structure, unless such footing or foundation is first properly underpinned or protected against settlement.

Any person making or causing an excavation to be made to a depth of twelve feet (12') or less, below the grade, shall protect the excavation so that the soil of adjoining property will not cave in or settle, but shall not be liable for the expense of underpinning or extending the foundation of buildings on adjoining properties where his excavation is not in excess of twelve feet (12') in depth. Before commencing the excavation the person making or cause the excavation to be made shall notify in writing the owners of adjoining buildings not less than 30 days before such excavation is to be made that the excavation is to be made and the adjoining properties shall be given access to the excavation for the purpose of protecting such adjoining buildings.

Any person making or causing an excavation to be made exceeding twelve feet (12') in depth below the grade, shall protect the excavation so that the adjoining soil will not cave in or settle, and shall extend the foundation of any adjoining buildings below the depth of twelve feet (12') below grade at his own expense. The owner of the adjoining buildings shall extend the foundations of his buildings to a depth of twelve feet (12') below grade at his own expense as provided in the preceding paragraph.

Fills. For fills, the general rule is that the exposed surfaces of a fill shall have a slope no steeper than one and one-half horizontal to one vertical, subject to certain modifications. In Pasadena, steeper slopes are permitted where a report prepared by a licensed civil engineer shows that no properties will be damaged by it.

Only clean soil may be used in a fill, with the following exceptions:

1. The fill shall be completed within a reasonable length of time, said time limit to be determined by the Superintendent of Building and to be specified on the grading permit.

2. Clean soil or earth shall be placed over the top and exposed surfaces of the fill to a depth sufficient to effectively conceal all materials, other than clean soil or earth, within the fill.

3. No grading permit shall be issued for the filling of materials other than clean soil or earth until a faithful performance bond in the amount of at least 10% more than the Superintendent of Building's estimated cost of adequately covering such fill with clean soil or earth. . . .In lieu of said faithful performance bond, a cash deposit in said amount may be made with the City Controller.

Compaction of Fills. The Los Angeles ordinance requires that any fill intended to support buildings must be made to a minimum of 90 per cent compaction. The Board of Public Works is responsible for adopting rules on compaction that include but are not limited to:

1. Preparation of the natural ground surface by removing top soil and vegetation and by compacting the fill upon a series of terraces.

2. Control of moisture content of the material used for fill.

3. Limitation on the use of various kinds of materials.

4. Maximum thickness of the layers of the fill to be completed.

5. Method of compaction.

6. Density requirements of the completed fill depending upon the location and use of the fill.

7. Tests required during the process of filling.

The Pasadena standards are spelled out in the ordinance as follows:

All fills intended to support buildings, structures or where otherwise required to be compacted for stability of material, shall be compacted, inspected and tested in accordance with the following provisions:

1. The natural ground surface shall be prepared by removal of top soil and vegetation, and, if necessary, shall be graded to a series of terraces.

2. The fill shall be spread in a series of layers, each not exceeding six (6) inches in thickness, and shall be compacted by sheepsfoot roller or other approved method after each layer is spread.

3. The moisture content of the fill material shall be controlled at the time of spreading and compaction to obtain required maximum density.

4. The fill material after compaction shall have minimum relative density of not less than ninety percent (90%) of maximum density, as determined by the Modified AASHO Soil Compaction

Test, or other approved testing method giving equivalent test results, in all portions of the fill requiring compaction.

5. A written report of the compaction, showing location and depth of test holes, materials used, moisture conditions, recommended soil bearing pressures, and relative density obtained from all tests prepared by a Civil Engineer licensed by the State of California shall be submitted to the Superintendent of Building for approval.

The Superintendent of Building may require additional tests or information if, in his opinion, the conditions or materials are such that additional information is necessary, and may modify or delete any of the above listed requirements that, in his opinion, are unnecessary.

CURB CUTS AND DRIVEWAYS

A difficult problem in the control of streets is the regulation of curb cuts for driveways. Some of the most important reasons for municipal control over curb cuts are stated in a report, Municipal Regulations of Curb Cuts for Driveways, published in 1948 by the League of North Carolina Municipalities:

1. Pedestrian hazards. Many filling stations have removed practically all of the curb in front of their installations, making it possible for vehicles to enter the sidewalk area at any point between the property lines. This has been particularly true with stations at street intersections. To permit this practice exposes the pedestrian to an increasing amount of traffic in an area where he should have the maximum amount of protection. It also encourages corner cutting by vehicles and sidewalk parking.

2. Drainage. Uncontrolled removal of curb and gutters may seriously affect proper drainage in the street. Instances have been noted where the curb has been completely removed and the grade altered to such an extent that the drainage has been seriously impaired and the street surface damaged as a result.

3. Parking space. In the business district, excessive removal of curb will materially reduce the potential curb parking space. One example has been called to the attention of the League wherein a particular filling station had removed all of the curb

for a total of 180 feet. This eliminated approximately seven parking spaces after giving 60 feet for driveways.

4. Increased liability. Sidewalks are designed and constructed for pedestrian use, and when vehicular traffic is permitted to use them, damage to the surface is inevitable. Holes, cracks and irregular surfaces are serious pedestrian hazards, and are an invitation to lawsuits.

The legal basis for municipal driveway regulation lies in the city's statutory power to regulate the use of its streets. However, the determination of an equitable but effective policy for regulation will be the result of balancing two conflicting kinds of rights in the use of streets: the right of access of abutting property owners and the right of the public to use streets for travel. The general legal rule is that no owner of abutting property may be denied access to a public street or highway without compensation. Nevertheless, he may not, in exercising this right, interfere unduly with the primary function of streets -- the movement of traffic.

Recently, several zoning ordinances have incorporated curb cut regulations as specification standards for filling stations, garages, and other automotive service uses. PLANNING ADVISORY SERVICE Information Report No. 67, Regulation of Filling Stations (October 1954), included a table of these provisions on page 27. If the seven principles on the advantages of general ordinances over the zoning ordinance in regulating problems of citywide scope are accepted, the tendency to include curb cut provisions only in the zoning ordinance appears to be ill advised. Usually curb cut specifications established under the zoning ordinance can apply only to new structures and uses in commercial areas. But as traffic congestion continues to increase, general regulations applicable to all uses throughout a community will probably become imperative. Strict regulation of curb cuts will be needed throughout the city and such regulations are best made through a general curb cut ordinance. Once basic standards have been applied to all areas of the city, the zoning ordinance may be used to provide even more stringent regulations in districts where the general standards are inadequate.

Driveway Ordinances

Most cities, as well as counties and states, exercise some type of control over driveway construction. Permits are commonly required for each driveway that provides access to a public highway from private property. Driveway permits may be issued by the city council or other legislative body, by the city official responsible for the maintenance of streets as an administrative act without specific statutory or ordinance authorization, or

under the provisions of a curb cut ordinance passed by the governing body and administered by a designated municipal official.

At best, the first two procedures are questionable practices. If permits are issued by the city council, either much of that body's time will be taken up in reviewing requests for driveway permits or the policy of "aldermanic courtesy" will be invoked. Since driveways are a relatively trivial problem when compared with others facing municipal governing bodies, the second course of action may be expected in most cities. Permit applications supported by the alderman in whose district the curb cut is to be made will be approved without discussion or study. There will be little planned control over driveways, and the issuance of permits can become a method of repaying political debts or a source of graft.

When permits are issued by an administrative official without specific authorization there is always the question of the legality of the permits. A state highway department operating under the state's police power can probably regulate the issuance of permits as an administrative act. But since cities may exercise only those powers specifically delegated by the state in statutes or city charters, the courts might well hold the regulation of curb cuts by administrative order to be illegal. Even though state laws specifically authorize cities to issue driveway permits, it is usually necessary to pass local ordinances delegating this power to an administrative official.

Driveway and curb cut ordinances usually establish standards for the construction and location of driveways, conditions for the issuance or refusal of permits, and the powers of the administrator. Provisions on the following are included in comprehensive curb cut ordinances: designation of the administrator; scope of the ordinance; information required on applications for permits; permit fees; refusal and revocation of permits; transferability of permits; bonding of applicants; assessment of costs; appeals; and violations and penalties. Design standards may or may not be included in the ordinance, depending upon local practice.

Administrative Official. The official designated as the administrator of the curb cut ordinance will depend upon the size of the city and the organization of its government. The administrator is usually one of the following officials: city engineer, traffic engineer, superintendent or commissioner of public works or streets, or the building inspector. Where several city departments are concerned with the maintenance of streets, the ordinance may require that an application be approved by all of these departments before a permit is issued.

Scope. Ordinances may apply only to new driveways or to existing driveways as well. Typically, ordinances apply throughout the city, although

standards imposed on residential driveways are usually quite different from those applying to driveways for commercial or industrial uses. Curb cuts made under permits issued in accordance with the provisions of the ordinance must be maintained by the abutting property owner. If a driveway were built before the adoption of an ordinance, the owner is held responsible for bringing the driveway into conformity with ordinance requirements within a specified time. Thereafter, the owner must obtain a permit and maintain the curb cut. A provision requiring that all driveways in the community be brought into compliance with the ordinance is found in the driveway ordinance for Oak Park, Illinois, adopted in 1930:

> If any person now using or maintaining a driveway leading from a public street into abutting property shall fail to take out a permit for such use as herein provided, then the Commissioner of Public Works shall proceed to remove such driveway and close the opening in the pavement in connection therewith.

Application for Permits. Applicants are required to submit a plan or description of any proposed curb cut showing the location, grade, and dimensions. The administrator may require the submission of any additional information deemed necessary to determine the desirability of the proposed driveway.

Permit Fees. In only two of the curb cut ordinances reviewed in the preparation of this report were permit fees specified. In both cases, the fees were nominal. Winnetka, Illinois requires a $2 fee for all permits. Oak Park, Illinois charges a $5 fee for each new driveway less than 25 feet wide. But in industrial and commercial areas wherever more than one driveway entrance is maintained, this ordinance requires that "there shall be paid to the Village of Oak Park an annual permit fee of Five ($5.00) Dollars for each driveway entrance in excess of one and a fee of Two ($2.00) Dollars per lineal foot in excess of twenty-five (25) feet."

Where ordinances do not specify a permit fee, it is presumed that no fee is required or that the administrator is given the power to determine a proper fee for issuing permits (also a questionable practice).

Refusal and Revocation. The administrator is instructed to refuse to issue a permit for any driveway that does not meet ordinance requirements. However he is sometimes given discretionary power to refuse permits for driveways that will unduly interfere with the movement of traffic. Even though such a power may constitute an exceptional delegation of discretionary power to an administrative official, the courts have sometimes upheld refusals of permits based on the effect of the driveway on traffic. The following cases uphold the refusal of an administrative official to issue permits for gasoline stations

on grounds of increased traffic: Ficht v. McMullen, Supreme Court of Florida, April 10, 1940, 195 S. 610; Hirschorn v. Castles, Supreme Court of New Jersey, August 17, 1934, 174 A. 211; and Dickenson v. Inhabitant of Plainfield, Supreme Court of New Jersey, February 1939, 4 A.2d. 91, 4 A.2d. 95, and 176 A. 716.

The governing body may, at its will, revoke or modify any permit when the driveway is not maintained in conformity with the ordinance or when traffic conditions require that driveways be eliminated. In some cases, as in the Milwaukee ordinance (1923), the administrator can revoke a permit and require the closing of the driveway:

> Whenever any of the provisions of sections 1204.1 to 1204.7, inclusive, shall be violated, the Commissioner of Public Works shall, and he hereby is authorized and directed to order such driveways, or as much thereof as shall offend such sections, to be taken up, and, upon refusal of the owner or owners to do so, shall cause the same to be done and charge the expense of removal to the property owners.

Bonding of Applicants. Cities almost always require that a deposit or performance bond be posted guaranteeing the completion of work done on public property. Curb cut ordinances usually require that the amount of the deposit be sufficient to cover not only the cost of completing the driveway or restoring the curb to its original state but also the costs of re-laying cables and conduits or moving fire hydrants, telephone poles, street trees, or other objects displaced by the driveway.

Transferability of Permits. Generally, curb cut or driveway permits are given to individuals and do not run with the land. This is necessary because performance bonds are not transferable.

The Oak Park ordinance, however, does permit the transfer of a driveway permit under certain conditions. In general, they provide that any person, firm, or corporation to whom a permit is granted or who has a bond to construct, maintain, or use a driveway leading from a public street into abutting property, and who has conveyed his interest in the premises may notify the Commissioner of Public Works, in writing, of the conveyance. He must give the commissioner, also in writing, the name and address of the purchaser. Thereafter, the original owner may get from the commissioner a permit to discontinue the use of the driveway and to restore the street pavement, sidewalk, and parkway in front of the premises in a manner similar to adjoining streets, sidewalks, and parkways. Upon completion of the work to the satisfaction of the commissioner, all liability under the bond given by the original owner ceases, except for acts or causes of actions prior to the

construction of the driveway. If, however, the purchaser pays the transfer fee provided for and executes a new bond with the same conditions, a renewal permit can be issued to the purchaser covering the driveway specified in the original permit. It is then unnecessary for the person to whom the original permit was issued to close up the driveway. The filing of the new bond and the securing of a new permit by the purchaser releases the original owner from liability under his bond (except for actions prior to filing the new bond) as if the use of the driveway had been discontinued to the satisfaction of the Commissioner of Public Works.

Appeals and Variances. The administrator is usually required to refuse to issue a permit that does not conform with all ordinance requirements and design standards. However, his action is often subject to review by the legislative body of the city. The review provision of the Winnetka, Illinois ordinance (1933) reads:

> In the event the Superintendent of Public Works in his discretion shall refuse to issue a permit for the driveway, his action in so refusing such permit shall be subject to review by the Village Council. If the Village Council finds that the construction and maintenance of any such driveway will not substantially impair, endanger or interfere with the public safety, it shall by resolution direct the issuance of any such permit for a driveway or driveways of such width and at such location or locations as to the Council shall be considered proper in furtherance of public safety; otherwise such permit shall not be issued.

The Wichita, Kansas ordinance (1950) provides for the issuance of variances by the city engineer:

> Building Division Cooperation. Any plans submitted to the Building Inspector for approval which include or involve unusual driveway approaches or problems, shall be referred by the Building Inspector to the City Engineer for his approval before a building permit is issued.
>
> Unusual Conditions. The City Engineer is hereby authorized to grant in writing variances from the strict application of the provisions of this ordinance, provided he first determines that the following conditions are present:
>
> 1. The exception or variance desired arises from peculiar physical conditions not ordinarily existing in similar districts in the City or is due to the nature of the business or operation on the abutting property.

2. That the exception or variance desired is not against the public interest, particularly safety, convenience and general welfare.

3. That the granting of the permit for the exception or variance will not adversely affect the rights of adjacent property owners or tenants.

4. That the strict application of the terms of this ordinance will work unnecessary hardship on the property owner or tenant.

Curb Cut and Driveway Standards

Design standards for the location and construction of curb cuts are established by ordinance or administrative act. A few ordinances establish one set of standards that apply to driveways serving all kinds of uses. Others provide different regulations for driveways serving residential and commercial properties. But most ordinance standards appear to be applicable only to commercial uses. This is particularly true of those in zoning ordinances where the standards apply only to specified uses such as filling stations, garages, drive-in restaurants, theaters, and similar uses.

Standards for Driveways Serving Commercial Uses. Design standards for commercial driveways usually cover some or all of the following factors: maximum number of driveways permitted in any lot frontage; maximum width of driveway pavement and curb cuts; minimum distances of driveways from intersections, property lines, other driveways, fire hydrants, utility poles, street trees, and other obstacles; specifications for curb returns (that portion of the curb that connects the driveway approach to the street curb); maximum and minimum slopes of driveways; and the type and quality of materials used in driveway and curb construction.

Standards on the location of driveways found in ten city ordinances and several publications on standards (see list at end of this section) used in the preparation of this report are summarized below:

Number of driveways	2, sometimes 2 per 100 feet of frontage
Maximum width of driveway at outside edge of sidewalk	25 - 40 feet
Maximum width of curb cut	35 - 52 feet

Minimum distance from:

Intersections	10 - 25 feet
Property lines	3 feet
Other driveways	12 - 40 feet
Fire hydrants, catch basins, etc.	3 feet
Minimum angle of driveway to street	45 - 90 degrees

The slope of driveways must be regulated to assure proper drainage and avoid excessive grades on sidewalks. A minimum grade requirement is that driveways shall have a slope of not less than one-quarter inch in each foot. A maximum grade, measured at the sidewalk, is one inch of vertical rise in each horizontal foot.

In addition, ordinances sometimes specify a minimum or maximum radius for curb returns. One such requirement is that a curb return be no greater in radius than the distance between the curb and the outside edge of the sidewalk. The standard for curb returns specified in Minimum Standards for Entrances to Highways from Commercial Establishments, adopted in 1951 by the North Carolina State Highway and Public Works Commission, is that curb returns have a radius of not less than five or more than 20 feet.

Standards on materials should conform with the standards used throughout the city in specifying the kind, quality, and amount of materials used for sidewalks, curbs and gutters, and streets. Such standards are seldom specified by ordinance but are prepared by the city street administrator. Ordinance requirements are usually limited to setting up the general areas in which standards may be developed, such as requirements for integrated curbs and gutters, regulations on the type and depth of materials used in sidewalk construction, and specifications that concrete be used on driveways.

Driveways for Residential Properties. The few ordinances that have special requirements for residential driveways permit the following: maximum width of curb cut -- 12 to 42 feet; maximum width of driveway pavement -- 12 to 20 feet; minimum distance from other driveways -- 3 to 40 feet. With these exceptions, standards applicable to commercial driveways are presumed to apply also to driveways for residences. Materials standards are almost always left to the discretion of the administrator.

Publications on Driveway Ordinances

Minimum Standards for Entraces to Highways from Commercial Establishments, 1951. North Carolina State Highway and Public Works Commission,

Raleigh, North Carolina. 21 pp., illus. Consists of illustrations of standards adopted by administrative action to regulate curb cuts.

Municipal Regulation of Curb Cuts and Service Driveways. Information Bulletin No. 34. Bureau of Municipal Research and Service, University of Oregon, Eugene, cooperating with the League of Oregon cities. 1939. 19 pp., mimeo., illus., tables. Selected provisions from curb cut ordinances.

Municipal Regulation of Curb Cuts for Driveways. Report No. 62. North Carolina League of Municipalities, 1009 Raleigh Building, Raleigh. 1948. Unpaged, mimeo., illus. $1. Includes a model ordinance and illustrations of standards for curb cuts and driveways.

Residential Street Standards. League of Wisconsin Municipalities, 30 East Johnson Street, Madison 3. 1956. 40 pp., offset, tables, maps. $2. Included in this report are the results of a survey on requirements for driveways and streets in residential areas of cities in Wisconsin and throughout the United States.

Roadside Protection. American Automobile Association, Pennsylvania Avenue at 17th Street, Washington 6, D. C. 1951. 132 pp., illus. $1.50. Contains a detailed section on curb cut standards for state highways established through administrative action.

STREET TREES

Municipal street tree planting programs seldom meet serious public opposition. Most people realize that trees improve the appearance of residential areas and major streets by lessening the monotony of brick, wood, and concrete. Healthy trees shade pedestrians from direct summer sunlight, help purify the air, and moderate winds and temperatures. Large, healthy street trees help stabilize property values and are themselves valuable.

On the other hand, unless they are properly planted and maintained, trees become nuisances: overhanging branches obscure vision at street intersections and impair the effectiveness of street lighting; improperly trimmed trees interfere with overhead utility wires; roots can clog sewers and break up sidewalks and street pavements; leaves, fruits, and nuts falling from trees must be removed quickly or they will block catch basins and storm drains; diseased or dead trees must be removed.

Healthy stands of street trees do not just happen. They are the result of careful planting and continuing maintenance. In the past, street trees were usually planted by individuals or garden clubs. Cities seldom assumed

responsibility for planting or maintaining trees and, if anything, merely removed those trees that constituted a hazard to pedestrians or vehicles using public streets. Today, in large cities effective programs for tree planting and maintenance can seldom be conducted by private agencies or individual property owners. In some areas neighborhood associations or home owners plant good trees and provide maintenance; in other areas no new trees are planted and existing trees are not trimmed or pruned. Citywide street tree programs can be carried out only through action of the municipal government.

Programs in various cities run the gamut from complete control of all planting and maintenance by the city, using city employees under the supervision of a trained forester, to programs consisting only of the regulation of private planting. In cities where the most effective programs have been developed, the municipality has usually used city employees to plant and maintain trees. This practice is recommended by the National Shade Tree Conference. Less expensive (and frequently less effective) programs can be developed whereby the city plants and maintains trees along major streets and leaves planting in residential areas to property owners. Cities that leave all planting to individuals often make trees suitable for street planting available to them at little or no cost.

Street Tree Regulations

Street tree programs are established by ordinances that set up regulations for tree planting and maintenance and delegate administrative authority to specified city officials. Municipal policy on street trees will determine the types of regulations needed to achieve the desired kind and quality of planting. The ordinance may be quite limited if the city handles all planting, trimming, and removal of trees. Detailed standards are not necessary. However, when people other than employees of a municipal department are permitted to work on trees, the ordinance must either establish strict standards or delegate the power to prepare standards to the administrator.

Scope of Ordinance and Municipal Street Tree Policy. Depending upon municipal policy, ordinances contain some or all of the following provisions: scope of the ordinance and municipal street tree policy; delegation of powers and duties to an administrative official, and designation of the municipal department that maintains trees; protection of trees from mutilation or damage, including limitations on who may plant, transplant, maintain, trim, prune, or remove trees; limitations on house moving; standards on planting, location, removal of trees (or delegation to administrator of power to prepare such standards); lists of permitted or prohibited trees; requirements for permits; public safety requirements that property owners maintain trees and re-

port defective trees to the proper authorities; methods of assessing costs of street trees and maintenance to owners of abutting property; administrative provisions on public hearings, amendments, separability, violations and penalties.

The National Shade Tree Conference in 1945 published a suggested street tree ordinance (see references at the end of this section), which contains a "model" statement of policy:

> The City of_____shall assume complete responsibility for the purchase, planting, maintenance and removal of all trees and shrubs growing now or hereafter in any highway, park, or public place of the City of_____, as promptly as financial and labor conditions will permit. Permits for planting, maintenance and removal of trees and shrubs may be granted temporarily as specified [in this ordinance].

This policy would, of course, be applicable only in cities where the government handles all tree planting and maintenance.

Most ordinances are intended to regulate all planting within streets and other public property. However, some ordinances, such as that of Minot, North Dakota, specifically exempt small shrubbery (under three and one-half feet in height) from the provisions of the ordinance. However, this ordinance does give the administrator the power to remove any shrubbery planted by abutting property owners in public rights-of-way if planting constitutes a hazard.

Administrator. The ordinance either establishes a new position of city forester or arborist or it designates the city official charged with the administration of the ordinance. Usually a brief statement of duties suffices, giving the administrator power to issue permits, prepare standards for planting in public areas, and to carry out other regulations. In smaller cities where a new position is not created, the official most frequently designated as city forester is the director of public works, the city engineer, or the superintendent of parks.

Ordinances also specify the city department that does the work of planting, trimming, and removing trees under the supervision of the administrator. This is usually the department of parks or the department of public works.

Protection of Trees. One provision found in nearly every tree ordinance prohibits the mutilation and destruction of street trees. The following is a "model" provision for such, prepared by the National Shade Tree Conference:

Protection of Trees and Shrubs: No person shall break, injure, mutilate, kill or destroy any tree or shrub, or set fire or permit any fire to burn where such fire or the heat thereof will injure any portion of any tree or shrub in any highway, park, or public place of the City of_____; no person shall knowingly permit any leak to exist in any gas pipe or main within the root zone of any such tree or shrub; no person shall permit any toxic chemical, either solid or liquid, to seep, drain or be emptied on or about any tree or shrub; no person shall knowingly permit any wire designed to carry electric current to come in contact with any such tree or shrub unless protected by approved methods; and, no person shall attach any electric insulation to any tree or shall excavate any ditches, tunnels or trenches, or lay any drive within a radius of ten (10) feet from any tree or shrub without first obtaining a written permit from the City Arborist. Whenever the City Arborist determines it to be necessary, in order to prune or remove any tree or shrub in any highway, park or public place of the City of_____, or for any other reason temporarily to protect, move or cut off the electricity from any service wire, he shall serve written notice on the owner of such wire, to protect, move or cut off the electricity from such wire and said owner shall comply with such order within twenty-four hours after the service of said notice.

Protection provisions often include requirements that before houses may be moved, the mover must obtain a permit indicating that the moving vehicles will not damage shade trees along the route.

These provisions also often place upon the adjacent property owner the responsibility for trimming trees and removing dead branches. Under orders from the city forester, property owners may be required to remove trees from the public right-of-way in front of their houses if the trees endanger public safety. Where persons other than city employees are permitted to work on trees, there may be provisions requiring that only licensed tree surgeons or experts may move, plant, or trim trees.

Public utility companies are usually empowered to remove branches or trees that interfere with existing overhead or underground utility lines. However, the approval of the arborist may be required before new lines are installed on streets containing trees.

Permits. Permits are usually required for work on street trees by individual or private corporations. An exception to this rule occurs in small cities where the written or oral permission of the administrator may be sufficient. Typically, permits specify the work to be done and require that it

meet all standards on planting, moving, spraying, fertilizing, bracing, trimming, cutting above or below ground, and the quality of tree surgery. A standard permit form, developed by the National Shade Tree Conference, is reproduced with this report.

Permits are valid for only a limited amount of time because the type of work that may be performed without damaging trees varies according to the seasons of the year. Therefore, ordinances sometimes require that work be completed in the season in which it is commenced. Other ordinances specify that an expiration date be placed on each permit or that all work be completed within a short time of the issuance of the permit -- in some cases as little as 15 days. No ordinance analyzed in the preparation of this report made a charge for tree permits. It is possible, of course, to charge a small fee to cover the administrative costs of issuing the permit. But in cities where property owners must plant trees and bear all the costs of planting, even a small permit fee might discourage widespread planting.

Public Safety. Ordinances specify that damaged or dead trees constitute a nuisance and require that the property owner abate the nuisance according to standards set up in the ordinance. Depending upon municipal policy, the actual work of removing trees may be done by the city department, the property owner, or tree surgeons.

Costs. Municipal policies on costs vary widely. Cities may assume the entire cost of planting and maintaining trees and finance the program from general municipal funds, but it is more common for programs to be financed through special assessments against improved properties. Where special assessments are used, the procedures for establishing an assessment district must follow statutory requirements.

Property owners almost always have to pay for work done to remove defective or dead trees on private property or in the right-of-way in front of houses if the work is done by municipal employees. The street tree ordinance usually specifies that the costs of work will be assessed against the property owner and constitute a lien on the property until paid.

Administrative Provisions. Detailed procedures on the administration of street tree ordinances depend almost entirely upon local practices and statutory requirements. Commonly, ordinances include provisions on hearings on the removal of trees, notice to property owners on trees that constitute a nuisance, provisions on separability, appeals to the city council from rulings of the administrative officials, emergency provisions giving immediate effect to the ordinance, and the like.

Violations and Penalties. Penalties for violations of street tree ordinances usually specify fines, jail sentences, or both. Such violations are misde-

meanors and call for maximum fines of between $10 to $300 or imprisonment for between 20 to 90 days. Usually, each action not in conformity with the ordinance and each day that a violation continues is considered a separate offense.

Specifications and Standards of Practice

Standards established in the ordinance or under ordinance authorization include statements of policy on the administration of standards; lists of permitted or prohibited trees; and requirements on planting, trimming, fertilizing, spraying, and repairing cavities, and bracing trees.

Administrative Policy. Policy statements require that all planting conform with standards, but it also gives the administrator power to make variations in the standards under exceptional conditions. The following policy statement is suggested by the National Shade Tree Conference in its "Standard Arboricultural Specifications and Standards of Practice" (see reference below):

Policy

1. All work shall comply with the Ordinance of the City of_____.

2. The Arboricultural Specifications and Standards of Practice shall be adhered to at all times, but they are subject to change at any time whenever experience indicates better methods or whenever circumstances make it advisable to vary the customary routine.

3. The policy of this Department shall be one of co-operating with the public and property owners at all times.

4. No trees or shrubs planted on the line between public and private property shall be removed without first consulting with the owners.

5. No trees shall be removed from the public highways, parks, or other public areas by the Department of Parks unless they constitute a definite hazard to life or property, a public nuisance, or because a revision of planting plans necessitates.

Species. Not all trees are equally desirable as street trees and some varieties are particularly unsatisfactory. The best varieties of trees for street planting are those that are particularly beautiful, adaptable to local climate, long-lived, fast-growing, resistant to damage and to disease and injurious

insects. Standards usually include lists of permitted trees that have these characteristics, as well as trees specifically prohibited because of serious deficiencies. If the planting plan calls for specific varieties along certain streets, the standards require that only those varieties may be planted.

Prohibited trees are those that have one or more of the following undesirable characteristics: excessively thick foliage that provides too much shade; low branches that interfere with movement on streets and sidewalks; unpleasant odors; excessive production of nuts or fruits; susceptibility to disease or attack by insects; or large root systems. A list of trees prohibited in planting strips appears in Planting, Maintenance and Removal of Trees from Streets, prepared by the Bureau of Municipal Research and Services of the University of Washington:

> Prohibited Trees. It shall be unlawful to plant in any public parking strip the following trees: Poplar, Willow, Cottonwood, Fruit Trees (except ornamental types), Nut Trees, Ailanthus, Mountain Ash, and Oregon or Big-Leafed Maple.
>
> Poplar, Willow, American Elm, or Cottonwood Trees hereafter planted anywhere in the city must be placed at least one hundred feet away from public sewers.

The University of Washington publication also includes detailed lists of trees suitable for different types of locations. (These are reproduced as an appendix to this report.) A detailed list of suggested street trees and their advantages and disadvantages is contained in Street Trees for Cities, published in 1947 by the Bureau of Municipal Research and Service of the University of Oregon.

Climatic conditions may, however, outweigh all other considerations in determining which trees can best be used along streets in a particular city. For example, a report, Street Trees for Anchorage, prepared in 1955 by the Anchorage, Alaska planning commission, recommends that white birch, which is particularly adaptable to cold climates, be used as the primary street tree. Birch is seldom used in the states. Also, while coniferous trees are usually prohibited in the states, Anchorage selected white spruce as its secondary tree. It was believed that the disadvantages of low branches and excessive shade would be overcome by the sturdiness of the tree, its resistance to disease and extreme weather conditions, and by the fact that it is an evergreen.

Planting. Planting requirements include standards on the size of trees when planted, the grade or quality of trees, their location, and methods of planting and support.

All new trees should be free of defects and have straight trunks and well-developed roots and tops characteristic of the variety of the tree. The size of trees when planted will, of course, depend upon the type. A generally accepted rule is that trees of large varieties be at least one and one-half to two inches in diameter six inches to one foot above the ground and that they be between ten and 15 feet in height. Standards for small trees are based on the number of branches (usually a minimum of five is required) and height (four or five feet).

Street tree location is a controversial subject. Formerly, most street trees were set in planting strips between the sidewalk and street pavement. Recently there has been a trend toward planting trees on the public right-of-way between the sidewalk and the front property line, or on the private property itself. Proponents of planting behind the sidewalks or on private property claim that maintenance problems are reduced because less trimming is required to avoid entanglement in overhead wires, that street lighting is improved, and that there is less interference with drivers' vision. Those who believe that planting strips are the proper place for street trees hold that the same benefits can be obtained through proper regulation and careful selection of trees in planting strips.

Standards are established for the location of trees in relation to other trees, sidewalks and streets, fire hydrants, utility poles, street intersections, and other obstacles that might interfere with tree growth or pose other problems. In the table on page 31, which summarizes provisions on the location of street trees, it will be noted that small trees generally require larger areas than the large trees. This is because the small trees have low branches, which interfere with pedestrian and vehicular movement if the trees are planted close to streets or sidewalks.

Holes for planting new trees should be large enough to accommodate roots without crowding or damaging them. If drainage is poor, drainage tile should be installed to guarantee that water will not stand in the hole. Roots may or may not be balled, but good soil should be brought in to help tree growth in its early stages and trees should be planted at the depth at which they were previously planted (or, as specified in some ordinances, one or two inches deeper). Guy wires, cables, or stakes are often required to support newly planted trees in an upright position. If wires are used, the trunks of the trees should be padded to avoid cutting.

Trimming and Removal. The basic rule on trimming and removal is that no such operations may be undertaken unless permission is granted by the administrator. However, he may also require that branches be trimmed or removed in order to maintain adequate clearance above streets and sidewalks. Typical standards are that free passage areas of ten feet above sidewalks, 12

Requirement	Standards in feet	
	Large trees	Small trees*
Minimum size of planting strip	3 - 8	20
Minimum right-of-way beyond sidewalk	6	12
Minimum distance from:		
Other trees	30 - 50	30
Intersections	20 - 30	35
Driveways or alleys	10	20
Sidewalk or pavement	2 - 3	--
Street lights	12	--

*Taken from the suggested ordinance of the National Shade Tree Conference, the only ordinance inspected in preparing this report that included standards for small trees.

feet above streets, and 16 feet above major streets be maintained to assure free movement of pedestrians and vehicles without interference from overhanging branches. Since small trees are usually planted some distance from streets and sidewalks, they are not usually affected by such regulations. When trees are being trimmed, streets and sidewalks should be barricaded to protect the public from falling branches and limbs. When trees are removed, the stump should be destroyed and the hole filed with earth, or the tree should be cut off below ground level and soil or pavement placed over the old root.

Spraying and Fertilizing. Most ordinances state that the administrator shall adopt standards for spraying and fertilizing of trees according to accepted standards. Requirements for bracing trees and treating and covering cavities should also follow generally accepted practices. The administrator is required to check all completed work for compliance, and he may demand that improper work be redone according to ordinance standards.

Publications on Street Tree Regulation

The following publications contain suggested street tree ordinances or information on the development of tree standards:

Planting, Maintenance and Removal of Trees from Streets. Report No. 111. Bureau of Governmental Research and Services, University of Washington, Seattle, in cooperation with the Association of Washington Cities. 74 pp., illus., charts. Information on location of trees and selection of species; also includes model ordinance and excerpts from ordinances in force in Washington cities.

"A Standard City Ordinance Regulating the Removal, Planting and Maintenance of Shade Trees in Public Areas" and "Standard Arboricultural Specifications and Standards of Practice," reprinted from Proceedings of the Twenty-first National Shade Tree Conference, 1945, Ohio State University, Department of Horticulture, Columbus. Pp. 39-52. A suggested ordinance, standards, sample permit form, and brief discussion of street tree regulations.

Street Trees for Cities. Planting Bulletin No. 1. Bureau of Municipal Research and Service, University of Oregon, Eugene, in cooperation with the League of Oregon Cities. 1947. 16 pp., illus., table. Contains a model ordinance, information and forms for ordinance administration, and a list of tree characteristics.

APPENDIX

Types of Plantings*

The species of trees to be planted should depend upon the importance of the street, width of street, and type of use as follows:

A. Highway approaches to the city center - warrant special consideration, in view of their importance as well as the many limitations involved and possibilities offered. For example, the Avenue of Redwoods along the Fourth Avenue approach to Portland from Oregon City.

B. Arterials and Parkways - also warrant special consideration leading to a thorough study of the possibilities and detail planning by specialized personnel. (Special Cases, infra.)

C. Residential - while the preceding thoroughfares suggest a more uniform treatment in the selection of tree species, the planting of the residential areas should be conceived as a means of providing a prolonged season of color without monotony. This can be accomplished by the balancing of the existing plantings and in the proper selection of tree species for initial planting of new developments.

1. In areas where some street tree planting is existing, the predominant species of any approved tree will be continued in that area. The remaining sub-dominant species will then provide the desired relief from monotony in an unstudied pattern.

2. In blocks where less than 20 per cent of the parkings are planted to acceptable trees, the planting would be considered as in a new development where an approved tree species for the particular street requirement would be selected as the dominant variety. Three sub-dominant species would also be selected to intermix at random with dominant species at a ratio of 40 per cent dominant and approximately 20 per cent of each sub-dominant species.

3. One sub-dominant species, perhaps the Washington Hawthorn, Crataegus cordata, would be selected for over-all planting throughout the city at a ratio of 20 per cent of the total plantings. This will achieve a tying-in of all sections of the city, giving unity, continuity, and a simultaneous city-wide floral display.

Types of Trees

A. The selection of tree types for the highway approaches and arterials would be the result of detailed studies to meet the special requirements, but should generally be confined to the following tree species:

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*From Planting, Maintenance and Removal of Trees from Streets.

Hard Maple	Sweet Gum	Black Walnut
Elms	Lindens	Conifers
Oaks	Plane Tree	Larix
Poplars	Horse-chestnut	

B. The selection of trees for residential areas would be made from the following list of suitable trees recommended for different conditions, the selection to include three sub-dominant species in addition to the dominant tree type. Fastigate tree forms may be used.

1. Plantings for streets having overhead clearance of utilities 35 feet or under should be selected from the following species:

Striped Maple	Acer pensylvanicum
Allegheny Serviceberry	Amelanchier laevis
Paperbark Maple	Acer griseum
Japanese Maple	Acer palmatum
Tatarian Maple	Acer tataricum
American Hornbeam	Carpinus caroliniana
Katsura Tree	Cercidiphyllum japonicum
Red Bud	Cercis canadensis
Flowering Dogwood	Cornus florida
Washington Hawthorn	Crataegus cordata (phaenopyrum)
English Hawthorn	Crataegus oxyacantha
Carolina Silverbell	Halesia carolina
Flowering Crabs	Malus species and varieties
Flowering Peach)	
Flowering Plum)	Prunus species and varieties
Flowering Cherry)	
Snowbell Tree	Styrax japonica

2. Plantings for streets having overhead clearance of utilities over 35 feet in height, but under 50 feet in height may be selected from the following:

David Maple	Acer davidi
Shadblow Serviceberry	Amelanchier canadensis
Hedge Maple	Acer campestre
Red Horsechestnut	Aesculus carnea
Pacific Madrone	Arbutus menziesii
Yulan Magnolia	Magnolia denudata
Kobus Magnolia	Magnolia kobus
American Hophornbeam	Ostrya virginiana
Chinese Pagodatree	Sophora japonica

3. Plantings for streets having no overhead utilities may be selected from the following:

Silver Linden	Tilia tomentosa
Norway Maple	Acer platanoides
Sugar Maple	Acer saccharum

Sycamore Maple	Acer pseudo-platanus
Horsechestnut	Aesculus hippocastanum
White Ash	Fraxinus americana
Maidenhair Tree	Ginko biloba
Sweet Gum	Liquidambar styraciflua
Mountain Silverbell	Halesia monticola
London Plane	Platanus acerifolia
Oriental Plane	Platanus orientalis
White Oak	Quercus alba
Scarlet Oak	Quercus coccinea
Red Oak	Quercus borealis
Pin Oak	Quercus palustris
English Oak	Quercus robur
American Linden	Tilia americana
Littleleaf European Linden	Tilia cordata
European Linden	Tilia europea

P E R M I T

(Issued in triplicate)

The City of.....

Department of Parks

APPLICATION NO. .....

DATE .....

Planting
Application for Treating Street Trees at
Removing

REET .....

MARKS .....

.....

If Permit is granted, I hereby agree to do the work in accordance with the boricultural Specifications, Standards of Practices and Directives given on the 'erse side of this application.

Signed .....
Property Owner

By.....
Agent or Tenant

Applicant not to fill in below this line

Inspector's Report

Date.....

dth of planting strip ..... ft. Width of sidewalk ..... ft.

dth of Roadway ..... ft. Total width of street ..... ft.

ilding setback from sidewalk ..... ft. Zoned for.....

pe of buildings..... Height overhead wire ..... ft.

ıds of existing trees in block.....

.....

proximate size ..... General condition.....

me of proposed tree.....

Signed.....Inspector

Date.....

plication approved by..... City Arborist

Date.....

ɪrmit issued ..... 19..... Permit expires December 31 June 15

(Specifications to be printed on back of permit)

1. THE TREE

The tree is to be from ..... to ..... inches in caliper (six inches from the grounc free from diseases, pests and mechanical injuries, straight of stem, with a well-balanced head, vigorous growth and provided with a well developed root system. The trunk of the tree to b free from branches to a height of at least seven feet from the ground and the first branch to b not over nine feet from the ground unless otherwise specified by the City Arborist. All trees use in any single block shall be pruned at the time of planting to secure similar height, shape and siz

2. TREE PIT

The exact location of the tree pit is to be determined by the City Arborist, and is to be accordance with the Park Department tree planting program for the block in which it is located.

The tree pit in each case is to be excavated at least ..... sq. ft. in area and ..... feet deep refilled with good fibrous topsoil to be approved by the City Arborist. All excess subsoil to be hauled away. When hardpan is encountered at the bottom of the pit, it is to b loosened to an additional depth of at least one foot. Where rock is encountered, it is to b removed to an additional depth of at least one foot and an additional width of at least one fo on all sides of the tree pit.

Where determined necessary by the inspector, a tile drain and/or dry well shall be installe to provide drainage and aeration, such dry wells to be located and constructed as shown on standar drawings in the Park Department files.

3 TREE PLANTING

The work of planting is to be done under the direction, and to the satisfaction of the Cit Arborist and subject to the rules and regulations of the Park Department. The Office of the Cit Arborist is to be notified not less than 48 hours in advance when the planting is to be done so a inspector can be assigned to direct the planting. Topsoil must not be placed in the hole and tr must not be planted until soil, tree and size of hole have been inspected and approved by the Cit Arborist, or until a release from any of the provisions of this paragraph is received in writing.

The tree is to be planted at the same depth as it was originally growing. As the soil is adde around the roots it is to be carefully tamped. After planting, water, and add a mulch of humu Peat moss or other moisture-retaining material is to be placed over the entire tree pit to a depth three inches.

The good health of the tree is to be guaranteed for at least one year.

4. STAKING

Two cedar or oak stakes, 2½ inches square by 10 feet long are to be provided for each sma tree. The stakes are to be driven firmly into the soil of the pit bottom in line with the tree an parallel to the street, and fastened to the tree with rubber hose, the guy wire to be complete covered where it encircles the trunk of the tree. Care is to be taken that the stakes in no place com in contact with the bark of the tree. Other methods of support may be followed if approved b the City Arborist.

5. TREE GUARDS AND GRATING

Where deemed necessary by the inspector, tree guards and gratings, of approved type, are be placed around the trees according to the Park Department specifications.

6. CARE AND CULTIVATION

Each tree is to be thoroughly watered at least once a week in dry weather, cultivated whe necessary and otherwise properly cared for by the owner of the premises in front of which they a set, at his expense, unless assumed by the City, and to the satisfaction of the City Arborist, for period of one year from the date of planting.

7. TREE TO BECOME PROPERTY OF CITY

The above trees are to become the property of the City when the guaranty period of one ye has been completed satisfactorily. Thereafter, no work aside from watering and cultivation, sha be done on the trees except by the Park Department or with its written consent.

8. OTHER SPECIFICATIONS

Specifications applying to pruning, other maintenance practices not covered above, or remov will be issued in connection with each specific case and attached to, and will become a part o this permit.

9. LIABILITY

All the work above referred to, shall be performed without cost to the Park Department. Th holder of this permit agrees not to hold the City of ....., the Park Department, any employee thereof, responsible for any liability by accident to persons or property, however cause through the exercise of this permit. Any tree improperly planted will be subject to removal by an at the direction of the City Arborist.